

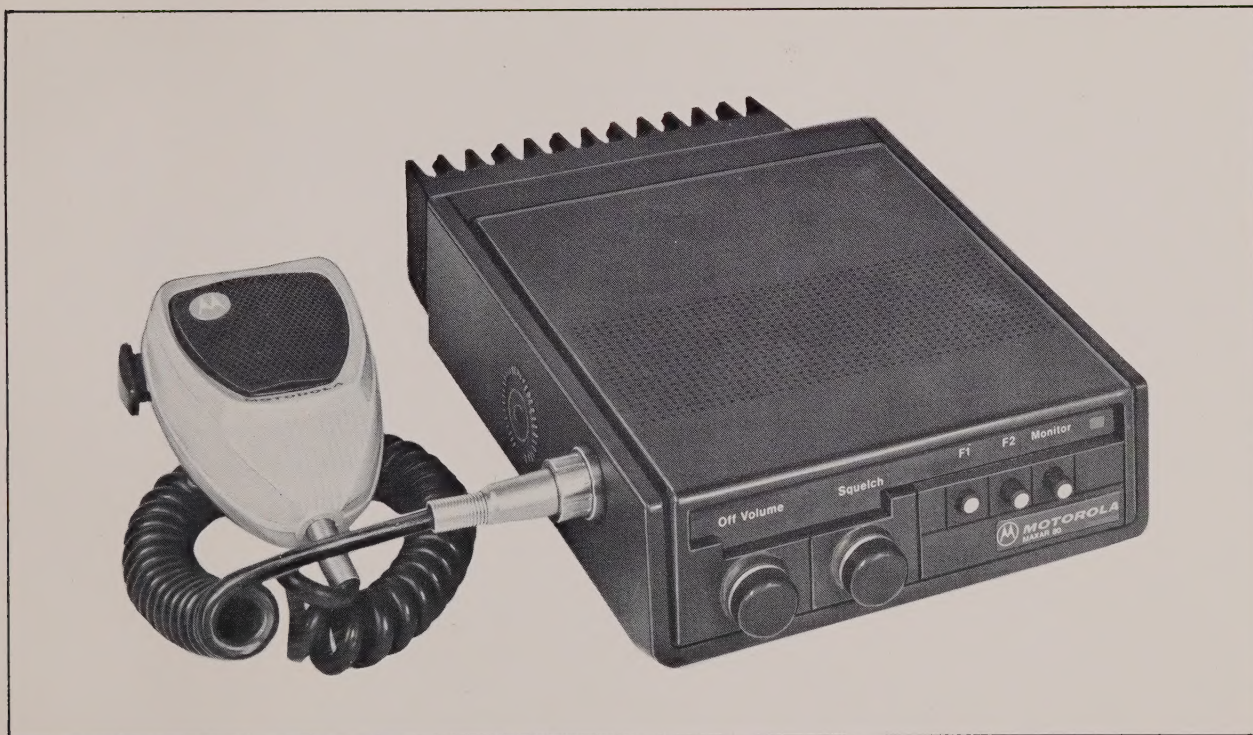


MAXAR-80[®]

Two-Way FM Radio

136-174 MHz

RECEIVED 155 SEP 1978



Instruction Manual

68P81037E95-O

**MOTOROLA****INSTRUCTION MANUAL REVISION**

SMR-3510

GENERAL

This revision outlines changes that have occurred since the printing of your instruction manual. Use this information to correct your manual.

INSTRUCTION MANUALS AFFECTED:**"MAXAR" Two-Way FM Radio**

68P81033E75-O	25-50 MHz
68P81025E70-H	136-174 MHz
68P81028E75-E	450-512 MHz
68P81034E10-O	450-512 MHz
68P81035E20-O	806-870 MHz

"MAXAR 80" Two-Way FM Radio

68P81038E05-O	25-50 MHz
68P81037E95-O	136-174 MHz
68P81037E90-O	450-512 MHz

REVISION DETAILS:

In the Tone "Private-Line" Encoder/Decoder parts list Model TRN6177B/C, the transistor Q406 is changed to type M9528 (Motorola Part No. 48-869528).

Instruction manual revision

REVISION 1.0

1.0 Introduction

General

This manual contains information that is necessary to use the product. It is intended for use by the user of the product.

Instruction manual attached:

1.0 Introduction

1.0 Introduction
1.1 Safety
1.2 Installation
1.3 Operation
1.4 Maintenance
1.5 Troubleshooting
1.6 Appendix
1.7 Index

1.0 Introduction
1.1 Safety
1.2 Installation
1.3 Operation
1.4 Maintenance
1.5 Troubleshooting
1.6 Appendix
1.7 Index

Revision details:

is the "Digital Private Line" Encoder/Decoder. The following changes are made:

Capacitor C015 is changed to 2.2 uF, 50V, 25 V electrolytic, 500 uF, 25 V electrolytic.

Capacitor C042 is changed to 680 pF, 50V, 50 V electrolytic, 500 uF, 25 V electrolytic.

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MAXAR-80®

TWO-WAY FM RADIO
136-174 MHz

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MOTOROLA INC.
Communications Division

service publications
1301 E. Algonquin Road, Schaumburg, IL 60196

DIAGRAMS & PARTS LISTS

TPN1136A Base Station Power Supply Schematic Diagram,
Circuit Board Detail, & Parts List..... 68P81029E96

Main Circuit Board Detail..... 68P81034E83 (sheet 1 of 4)

Receiver Schematic Diagram..... 68P81034E83 (sheet 2 of 4)

Radio Set Parts Lists..... 68P81034E83 (sheet 3 of 4)

Exciter Schematic Diagram..... 68P81034E83 (sheet 4 of 4)

Power Amplifier, Harmonic Filter, and Antenna Switch Schematic Diagram and
Circuit Board Detail and Parts List..... 68P81031E38

TRN6177C Tone “Private-Line” Encoder-Decoder
Schematic Diagram and Circuit Board Detail..... 68P81029E99

TMN1008A & TMN1009A Desk Microphone Schematic Diagram,
Circuit Board Detail, & Parts List..... 68P81030E06

TRN6207A “Digital Private-Line” Encoder/Decoder
Schematic Diagram & Circuit Board Detail and
Parts List..... 68P81030E07

SPECIFICATIONS

GENERAL

MAXIMUM BATTERY DRAIN at 13.6 V	TRANSMIT 7A	RECEIVE 1 A	STANDBY (SQUELCHED) 0.3 A
FREQUENCY RANGE	136-174 MHz		
DIMENSIONS	2-1/4" H x 6-1/2" W x 10-1/2" D (57mm x 165mm x 267mm)		
WEIGHT	4.8 lbs. (2182g)		

TRANSMITTER

RF POWER OUTPUT	25 Watts (136-174 MHz),
SPURIOUS & HARMONIC EMMISSIONS*	60 dB below carrier
OUTPUT IMPEDANCE	50 ohms
FREQUENCY STABILITY	%0.0005%; 30°C to + 60°C (+ 25°C reference)
MODULATION	16F3
AUDIO SENSITIVITY	160mV ± 3 dB for 3.0 kHz deviation at 1000 Hz
FM HUM & NOISE	-70 dB below ± 3.0 kHz deviation at 1000 Hz
AUDIO RESPONSE	+ 1, -3 dB from 6 dB/octave pre-emphasis (300 to 3000 Hz)
AUDIO DISTORTION	Less than 3%

*Per EIA specification RS-152B, paragraph 4.

RECEIVER

CHANNEL SPACING	30 kHz	
SELECTIVITY - EIA SINAD	-90 dB at ± 30 kHz	
INTERMODULATION - EIA SINAD	No Preamplifier	With Preamplifier
	-85 dB	-80 dB
EIA MODULATION ACCEPTANCE	± 7 kHz	
SENSITIVITY	.5 uV @20 dBq .35 uV @12 dB SINAD	.35 uV@20 dBq. .25 uV @12 dB SINAD
FREQUENCY STABILITY	± 0.0005%; -30°C to +60°C (+ 25°C reference)	
SPURIOUS & IMAGE REJECTION	Greater than 100 dB	Greater than 95 dB
SQUELCH THRESHOLD SENSITIVITY	Less than 0.2 uV	
AUDIO OUTPUT	3 watts, with less than 5% distortion	
AUDIO RESPONSE	+ 2, -8 dB from 6 dB/octave de- emphasis (300-3000 Hz)	

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

FCC TRANSMITTER LICENSE DESIGNATIONS

Freq. Range (MHz)	Freq. Stability (%)	Single Frequency	Two Frequency
136-150.8	.0005	CC3323	CC3324
150.8-162	.0005	CC3323	CC3324
162-174	.0005	CC3323	CC3324

SPECIFICATIONS (Cont'd.)

FCC RECEIVER CERTIFICATION NUMBERS

	WO/PREAMP	W/PREAMP
Single Frequency:	RC0204	RC0205
Two Frequency:	RC0206	RC0207

SAFETY INFORMATION

The United States Department of Labor, through the provisions of the Occupational Safety and Health Act of 1970 (OSHA), has established an electromagnetic radiation safety standard which applies to any two-way mobile radio equipment. Normal use of this radio will result in exposures far below the OSHA limit. There are no reported incidents of physical damage resulting from the use of this type of radio. However, the following precautions are recommended.

DO NOT operate the transmitter when someone outside the vehicle is within two feet of the mobile antenna.

DO NOT operate the transmitter near unshielded electrical blasting caps or in an explosive atmosphere.

FOREWORD

1. SCOPE OF MANUAL

This manual is intended for use by experienced technicians familiar with similar types of equipment. It contains all service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date are incorporated by Instruction Manual Revisions (SMR). These SMR's are added to the manuals as the engineering changes are incorporated into the equipment.

2. MODEL AND KIT IDENTIFICATION

Motorola equipments are specifically identified by an overall model number on the nameplate. In most cases, assemblies and kits which make up the equipment also have kit model numbers stamped on them. When a production or engineering change is incorporated, revision suffix numerals are added to the affected kit model number. For example, a TLN4448A becomes a TLN4448A-1 with the first revision, TLN4448A-2 with the second revision, etc.

As diagrams are updated, information about the change is incorporated into a revision column. This revision column appears in the manual next to the parts list or, in some cases, on the diagram. It lists the reference number, part number, and description of the parts removed or replaced when the suffix number changed. With this information, the technician can find the information for the current version, and any previous version, of the equipment covered by the manual.

3. SERVICE

Motorola's National Service Organization offers one of the finest nation-wide installation and maintenance programs available to communication equipment users. This organization includes approximately 800 authorized Motorola Service Stations (MSS) located throughout the United States, each manned by one or more trained, FCC licensed technicians.

These MSS's are independently owned and operated and were selected by Motorola to service its customers. Motorola maintenance is available on either a time and material basis or on a periodic fixed-fee type arrangement.

The administrative staff of this organization consists of national, area and district service managers and

district representatives, all of whom are Motorola employees with the objective to improve the service to our customers.

Should you wish to purchase a service contract for your Motorola equipment, contact your Motorola Service Representative, or write to:

National Service Manager
Motorola Communications Division
1303 E. Algonquin Road
Schaumburg, Illinois 60196

4. REPLACEMENT PARTS ORDERING

Motorola maintains a number of parts offices strategically-located throughout the United States. These facilities are staffed to process parts orders, identify part numbers, and otherwise assist in the maintenance and repair of Motorola Communications Division products.

Orders for all parts *except* crystals, active filters, code plugs, channel elements, and "Vibrasender"® and "Vibrasponder"® resonant reeds should be sent to the nearest area parts center. Orders for instruction manuals should also be sent to the area parts center.

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Orders for crystals, channel elements, active filters, code plugs, and reeds should be sent directly to the factory address listed on the following page. Crystal and channel element orders should specify the crystal or channel element type number, crystal and carrier frequency, and the chassis model number in which the part is used.

Orders for active filters, code plugs, "Vibrasender" and "Vibrasponder" resonant reeds should specify type number and frequency, and should identify the owner/operator of the communications system in which these items are to be used.

5. ADDRESSES

5.1 GENERAL OFFICES

MOTOROLA, INC.
Communications Group Parts Dept.
1313 E. Algonquin Rd.,
Schaumburg, Illinois 60196
Phone: 312-576-6521
Executive Offices: 1303 E. Algonquin Rd.,
Schaumburg, Illinois 60196

5.2 U.S. ORDERS

WESTERN AREA PARTS

1170 Chess Drive, Foster City,
San Mateo, California 94404
Phone: 415-349-3111
TWX: 910-375-3877

MIDWEST AREA PARTS

10 W. North Ave.,
Lombard, Ill. 60148
Phone: 312-620-3000
TWX: 910-693-1592

MID-ATLANTIC AREA PARTS

6701 Elkridge Landing Road,
Linthicum, Maryland 21090
Phone: 301-796-8600

EAST CENTRAL AREA PARTS

12995 Snow Road,
Parma, Ohio 44130
Phone: 216-267-2210
TWX: 810-421-8845

EASTERN AREA PARTS

85 Harristown Road,
Glen Rock, New Jersey 07452
Phone: 201-447-4000
TWX: 710-988-5602

PACIFIC SOUTHWESTERN AREA PARTS

2333 Utah Avenue,
El Segundo, California 90245
Phone: 213-644-1101
TWX: 910-348-6278

SOUTHWESTERN AREA PARTS

3320 Belt Line Road,
Dallas, Texas 75234
Phone: 214-241-2151
TWX: 910-860-5505

SOUTHEASTERN AREA PARTS

5096 Panola
Industrial Blvd.
Decatur, Georgia 30032
Phone: 504-981-9800
TWX: 810-751-8300

5.3 CANADIAN ORDERS

CANADIAN MOTOROLA ELECTRONICS COMPANY

Parts Department
3125 Steeles Avenue, East M2H 2H6
Willowdale, Ontario
Phone: 416-499-1441
TWX: 610-492-2713
Telex: 065-25191

5.4 ALL COUNTRIES EXCEPT U.S. AND CANADA

MOTOROLA, INC. OR MOTOROLA AMERICAS, INC.

International Parts Dept.
1313 E. Algonquin Road
Schaumburg, Illinois 60196 U.S.A.
Phone: 312-576-6492
TWX: 910-693-1592 or 1599
Telex: 722443 or 722424
Cable: MOTOL

5.5 FACTORY ADDRESS FOR CRYSTAL, CHANNEL ELEMENT, ACTIVE FILTER, CODE PLUGS AND RESONANT REED ORDERS

AIR MAIL ORDERS

Motorola, Inc.
Component Products Sales & Service
P.O. Box 66191
O'Hare International Airport
Chicago, Ill. 60666

REGULAR MAIL ORDERS AND CORRESPONDENCE

Motorola, Inc.
Component Products Sales & Service
2553 N. Edgington Street
Franklin Park, Illinois 60131

MOTOROLA

MODEL CHART
FOR
"MAXAR-80"
FM TWO-WAY RADIO
136-174 MHz
25 W RF POWER

CODE:

- [X] = ONE ITEM SUPPLIED WITH EACH RADIO
[/] = ONE ITEM SUPPLIED WITH EACH RADIO
DEPENDENT UPON FREQUENCY
[2] = NUMBER INDICATES QUANTITY SUPPLIED
WITH EACH RADIO. DEPENDENT UPON
FREQUENCY.
[*] = REFER TO UNIFIED CHASSIS MODEL CHART
FOR LOWER LEVEL KITS.

ITEM	DESCRIPTION	MODEL NUMBER		NUMBER OF OPERATING FREQUENCIES		TYPE OF SQUELCH	
		MODEL NUMBER		NUMBER OF OPERATING FREQUENCIES		TYPE OF SQUELCH	
*TUD2071AB	UNIFIED CHASSIS (136-150.8 MHz) 1-FREQ.; 25-WATT	D33TSA1000AK	1	1	1	MOBILE MODELS	
*TUD2072AB	UNIFIED CHASSIS (150.8-162 MHz) 1-FREQ.; 25-WATT	D33TSA1300AK	2	2	2	CARRIER	
*TUD2073AB	UNIFIED CHASSIS (162-174 MHz) 1-FREQ.; 25-WATT	D33TSA1300AK	1	1	1	"PRIVATE-LINE"	
*TUD2071AH	UNIFIED CHASSIS (136-150.8 MHz) 2-FREQ.; 25-WATT	D33TSA3300AK	2	2	2	"PRIVATE-LINE"	
*TUD2072AH	UNIFIED CHASSIS (150.8-162 MHz) 2-FREQ.; 25-WATT	D33TSA6000AK	1	1	1	DIGITAL "PRIVATE-LINE"	
*TUD2073AH	UNIFIED CHASSIS (162-174 MHz) 2-FREQ.; 25-WATT	D33TSA6300AK	2	2	2	DIGITAL "PRIVATE-LINE"	
KXN6121AA	CRYSTAL, TRANSMITTER (150.8-512 MHz)	L43TSB1100AM	1	1	1	BASE STATION MODELS	
KXN6121AG	CRYSTAL, TRANSMITTER (136-150.8 MHz)	L43TSB1130AM	2	2	2	CARRIER	
KXN6122AA	CRYSTAL, RECEIVER (150.8-512 MHz)	L43TSB3100AM	1	1	1	"PRIVATE-LINE"	
KXN6122AG	CRYSTAL, RECEIVER (136-150.8 MHz)	L43TSB3130AM	2	2	2	"PRIVATE-LINE"	
TRN6177B	ONE "PRIVATE-LINE" ENCODER/DECODER	L43TSB6100AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TRN6207A	ENCODER/DECODER BOARD	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TRN8427A	ESCU THEON FOR 1-FREQ.; CARRIER-SQUELCH	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TRN8429A	ESCU THEON FOR 2-FREQ.; CARRIER-SQUELCH	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TRN8428A	ESCU THEON FOR 1-FREQ.; "PRIVATE-LINE"	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TRN8430A	ESCU THEON FOR 2-FREQ.; "PRIVATE-LINE"	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
KLN6209A	SPONDER	L43TSB1100AM	1	1	1	CARRIER	
TRN6204A	HARDWARE FOR 1-FREQ.; "PRIVATE-LINE"	L43TSB1130AM	2	2	2	"PRIVATE-LINE"	
TRN6205A	HARDWARE FOR 2-FREQ.; "PRIVATE-LINE"	L43TSB3100AM	1	1	1	"PRIVATE-LINE"	
TRN6206A	HARDWARE FOR 2-FREQ.; CARRIER-SQUELCH	L43TSB3130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
THN6347A	HOUSING	L43TSB6100AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TPN1136A	POWER SUPPLY, 110 V	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TKN6992A	POWER CABLE	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TKN6842A	CABLE INTERFACE PAGE BASE	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TLN5992A	INSTALLATION	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TRN6005A	CODE PLUG	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TRN8496A	BASE TRAY	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TAD6111A	ANTENNA, ROOF TOP (136-144 MHz)	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TAD6112A	ANTENNA, ROOF TOP (144-152 MHz)	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TAD6113A	ANTENNA, ROOF TOP (152-162 MHz)	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TAD6114A	ANTENNA, ROOF TOP (162-174 MHz)	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TMN1008A	"PL" DESK MICROPHONE KIT	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TMN1009A	CARRIER-SQUELCH DESK MICROPHONE	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TMN1018A	"PL" DESK MICROPHONE (PAGING)	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TMN1114A	MICROPHONE	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	
TLN4839	MICROPHONE HANG-UP KIT	L43TSB6130AM	2	2	2	DIGITAL "PRIVATE-LINE"	
TRN6283A	"PL" MICROPHONE HANG-UP KIT	L43TSB6130AM	1	1	1	DIGITAL "PRIVATE-LINE"	

EPS-26003-O

RADIO SET ACCESSORY TABLE

KIT NUMBER	DESCRIPTION	
TMN6137A	HANDSET	
TRN6319A	HANDSET HANG-UP BOX	
TRN8253A	REVERSE ESCUTCHEON	1 FREQ., CARRIER SQUELCH RADIOS
TRN8254A		2 FREQ., CARRIER SQUELCH RADIOS
TRN8255A		1 FREQ., "PRIVATE-LINE" TONE-CODED SQUELCH RADIOS
TRN8256A		2 FREQ., "PRIVATE-LINE" TONE CODED SQUELCH RADIOS
TRN8257A		1 FREQ., DIGITAL "PL" CODED SQUELCH RADIOS
TRN8258A		2 FREQ., DIGITAL "PL" CODED SQUELCH RADIOS
TSN6030A	EXTERNAL SPEAKER	
TRN8496A	BASE STATION MOUNTING TRAY WITHOUT MICROPHONE CLIP	
TRN8495A	BASE STATION MOUNTING TRAY WITH MICROPHONE CLIP	
TRN6524A	SECURITY MOUNTING HARDWARE	
TRN6525A	RADIO-TO-TRUNNION QUICK MOUNTING SCREWS	

OPTIONS

OPTION KIT	DESCRIPTION
B561 SERIES	INDIVIDUAL CALL DECODER W/O HORN & LIGHT ALERTING
B562 SERIES	INDIVIDUAL CALL DECODER WITH HORN & LIGHT ALERTING
B563 SERIES	INDIVIDUAL & GROUP CALL DECODER WITH HORN & LIGHT ALERTING
B162 SERIES	INDIVIDUAL CALL WITHOUT HORN & LIGHT ALERTING
B163 SERIES	INDIVIDUAL CALL WITH HORN & LIGHT ALERTING
B164 SERIES	INDIVIDUAL & GROUP CALL DECODER
B165 SERIES	INDIVIDUAL & EXTENDED TONE "B" CALL
B12 SERIES	RECEIVER PREAMPLIFIER

EPS-26081-O

OPERATOR'S INSTRUCTIONS

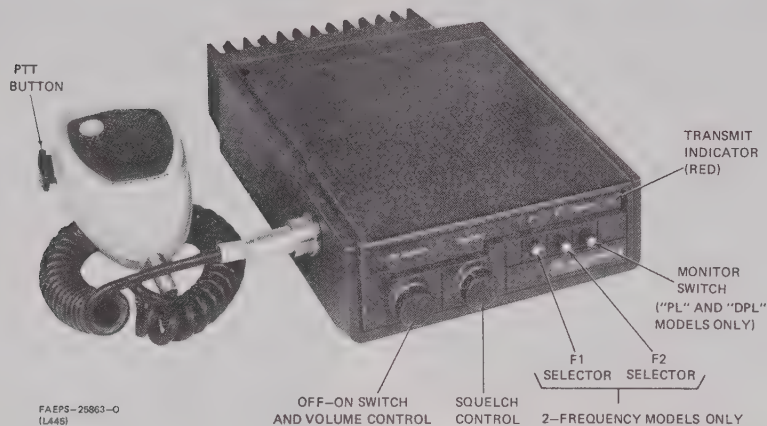


Figure 1.
Operating Controls and Indicators

1. TO TURN ON RADIO

The on-off switch for the radio set is operated by the OFF-VOLUME control. To turn on the radio set, rotate the OFF-VOLUME control knob clockwise until a click is heard. The front panel lamps then turns on to illuminate the control labels and the green ON indicator.

NOTE

When operating in extremely cold ambient temperature conditions (-10 to -30°C), allow 2 minutes after radio is turned on before transmitting to ensure compliance with FCC rules and regulations.

2. TO RECEIVE

OPERATION	PROCEDURE
1. Disable PL (PL Models only)	Press MONITOR button so it stays in. -OR- Remove microphone from hang-up box.
2. Unsquelch radio.	Turn SQUELCH control counter clockwise until noise is heard.
3. Set VOLUME control	Adjust VOLUME control for a comfortable listening level.
4. Set SQUELCH control.	Turn SQUELCH control clockwise until noise just stops.
5. Select operating frequency. (Two-frequency models only)	Press F1 or F2 button, as needed.

OPERATION

PROCEDURE

The radio is now adjusted to receive *all* messages on the selected frequency.

6. Enable PL (PL models only)

Press MONITOR button and allow it to return to the "out" position.

-AND-

If radio uses a microphone hang-up box, insert microphone into its hanger.

You are now able to hear messages for your system only.

3. TO TRANSMIT

3.1 MOBILE RADIOS

OPERATION	PROCEDURE
1. Disable PL (PL models only)	Press MONITOR button so it stays in. -OR- Remove microphone from hang-up box.
2. Select operating frequency (Two-frequency models only)	Press F1 or F2 button, as needed.
3. LISTEN	DO NOT TRANSMIT if anyone is using the channel.
4. Key transmitter	Press and hold down microphone PTT button. Red light on radio front panel will glow indicating that the transmitter is "on-the-air".

TO TRANSMIT (Cont'd.)

OPERATION	PROCEDURE
5. Transmit message	Hold microphone about 2 inches from your lips and speak slowly into microphone at a normal voice level. Shouting will not make your message easier to understand. Make each transmission as brief as possible.
6. Receive Reply	microphone PTT button.
7. Enable PL at end of conversation (PL models only)	allow it to return to the "out" position. -AND- Insert microphone into its hanger.

3.2 BASE STATION RADIOS

OPERATION	PROCEDURE
1. Select operating frequency (two-frequency models only)	Press F1 or F2 button, as needed.
2. Monitor the radio channel	Depress the microphone MONITOR switch.

OPERATION	PROCEDURE
3. Listen	Briefly listen for conversations on the radio channel.
4. Transmit the message	If the radio channel is not in use, depress and hold both the microphone MONITOR and TRANSMIT switches while speaking about 6 inches from the microphone. Speak distinctly and at a normal level. Release the TRANSMIT switch at the end of the message or to receive a reply.
5. Enable receiver muting (carrier squelch models)	At the end of the message or conversation release the microphone MONITOR switch.

NOTE

If JU2 is removed from the microphone (normal for paging base station to ensure that the operator monitors the channel) both the microphone transmit and monitor buttons must be pressed to transmit — releasing either switch ends the transmission.

PREINSTALLATION INSTRUCTIONS

1. UNPACKING

When unpacking the radio from its shipping carton, refer to the model chart at the front of this manual. If any item is missing, contact your Motorola representative immediately.

2. LICENSING REQUIREMENTS

FCC regulations state that a station license must be obtained for each radio installation (mobile or base) by the owner of the equipment. The station licensee is responsible for ensuring that the transmitter power, frequency, and deviation are within the limits permitted under the station license. Adjustments to the transmitter section of the radio may be made only by a technician possessing an FCC commercial operator's license. No license is required to install, check out, or operate the radio.

3. BENCH CHECK

3.1 INTRODUCTION

Each radio set is adjusted, tested, and inspected before shipment. However, it is recommended that both

the transmitter and receiver sections of the radio be checked for proper operation just prior to installation.

3.2 TESTING

The radio should be tested with all cables and accessories supplied with the radio connected as they will be in the final installation. The frequency, deviation, and output power of the transmitter should be checked, as well as the sensitivity, squelch operation, and audio quality of the receiver. Radios with PL or DPL capabilities should be operated in that mode to verify proper encode/decode performance. Refer to the specifications page at the front of this manual to determine whether the radio is operating properly. Improper operation can generally be corrected by touching up the receiver or transmitter alignment.

4. INSTALLATION PLANNING-MOBILE RADIOS

4.1 GENERAL

Planning is the key to fast, easy radio installation. Before a hole is drilled or a wire is run, inspect the vehicle and determine how and where you intend to mount the antenna, radio set, and accessories. Plan wire and

cable runs to provide maximum protection from pinching, crushing, and overheating.

4.2 ANTENNA MOUNTING

The best mounting location for the antenna is in the center of a large, flat conductive surface. In almost all vehicles these requirements are best satisfied by mounting the antenna at the center of the roof. Some vehicles have a large trunk lid that will provide a good antenna location. If the trunk lid is used, connect grounding straps between the trunk lid and vehicle chassis to insure that the trunk lid is at chassis ground.

4.3 RADIO MOUNTING

4.3.1 General

4.3.1.1 The Model TRN5992A Locking Trunnion consists of a two piece trunnion type mounting bracket equipped with a key lock and associated mounting screws and is designed to facilitate ease of removal. The locking trunnion may be mounted on either metal or plastic surfaces.

4.3.1.2 The optional trunnion mount (P/O TRN6209A Installation Kit) allows the radio set to be mounted to a variety of mounting surfaces. Be sure the mounting surface is able to adequately support the weight of the radio. Allow sufficient space around the radio for free air flow for cooling. Be sure the unit is close enough to the vehicle operator to permit easy access to operating controls.

4.3.2 Inverted Escutcheon Installation

A front panel escutcheon with inverted lettering (Motorola Option B96) is available if you plan to mount the radio above the operator's normal line of sight. Install the inverted escutcheon as follows:

Step 1. Remove the radio chassis from its housing (See Housing Removal procedure in SERVICE section).

Step 2. Using a long screwdriver, push on the back of the upright escutcheon until it is free of the radio housing front panel.

Step 3. Remove the tape from the back of the inverted escutcheon. Press the inverted escutcheon onto the radio housing front panel.

Step 4. Pull the pushbuttons off the F1, F2, and monitor switches. Invert the pushbuttons and replace them on the switches.

Step 5. Reinstall the radio chassis into the housing. Be sure the chassis locking tabs properly engage the slots in the housing.

4.4 DC POWER AND WIRING

4.4.1 This radio must be operated *only* in negative-ground electrical systems. Reverse polarity will not damage the radio, but the cable fuse will blow. Check the vehicle ground polarity before you begin installation to prevent wasted time and effort.

4.4.2 Connect the red power lead through F601 to the vehicle battery positive terminal. Connecting the red lead to any other positive voltage point in the vehicle is *not recommended*.

CAUTION

If dc power is to be controlled by the vehicle ignition switch, a switching relay (Motorola Part No. 59-813674) should be used to switch the red power lead. The vehicle ignition switch, then, controls dc to the relay coil.

4.4.3 Connect the black power lead to a good ground point on the vehicle chassis. *Do not* connect the black lead directly to the battery negative terminal.

4.4.4 The wiring provided with the radio is of sufficient size to handle the maximum radio current demand. If wiring must be added to that provided, be sure the gauge of the added wire is sufficient for the current to be carried and length of the added run.

5. INSTALLATION PLANNING—BASE STATIONS

5.1 ANTENNA SYSTEM

Selecting the antenna system for your base radio depends on factors beyond the scope of this manual. Your Motorola representative can help you choose the antenna system that will best serve your particular needs.

5.2 RADIO LOCATION

Choose a location for your base radio as close as possible to where the antenna cable enters the building. Be sure 117 volt, 60 Hz power is available. Make sure sufficient air can flow around the radio to permit adequate cooling.

INSTALLATION INSTRUCTIONS

1. MOBILE RADIOS USING TRN5992A LOCKING TRUNNION

1.1 MOUNTING CONSIDERATIONS

Before attempting to install the locking trunnion examine the vehicle for suitable mounting locations. The bracket requires a flat mounting surface at least 8" x 2" with adequate clearance for inserting the radio set. The chosen location should also be convenient to the vehicle operator and provide access to power and antenna connections. Be careful to choose a location which permits the locking trunnion to be removed from the mounting bracket. Vehicle operation should in no case be impaired.

1.2 INSTALLATION (Refer to Figure 2)

Step 1. Using the mounting bracket as a template, drill six 3/32-inch holes. If mounting on plastic surface, use metal backing plate to strengthen installation.

Step 2. Using the six #10-12 x 3/4" screws provided, attach the mounting bracket to the mounting surface. Allow 3/4 inch clearance in front of the bracket so locking trunnion may be inserted.

Step 3. Attach radio to locking trunnion using the two #10-32 x 5/8" screws provided.

Step 4. Insert the locking trunnion into the mounting bracket by first sliding the large flanges into the slots at the rear of the mounting bracket and then sliding the small locking flanges into the slots at the front of the mounting bracket.

Step 5. Lock the locking trunnion into the mounting bracket using the key provided.

Step 6. Perform Steps 2 through 9 in paragraph 2 below.

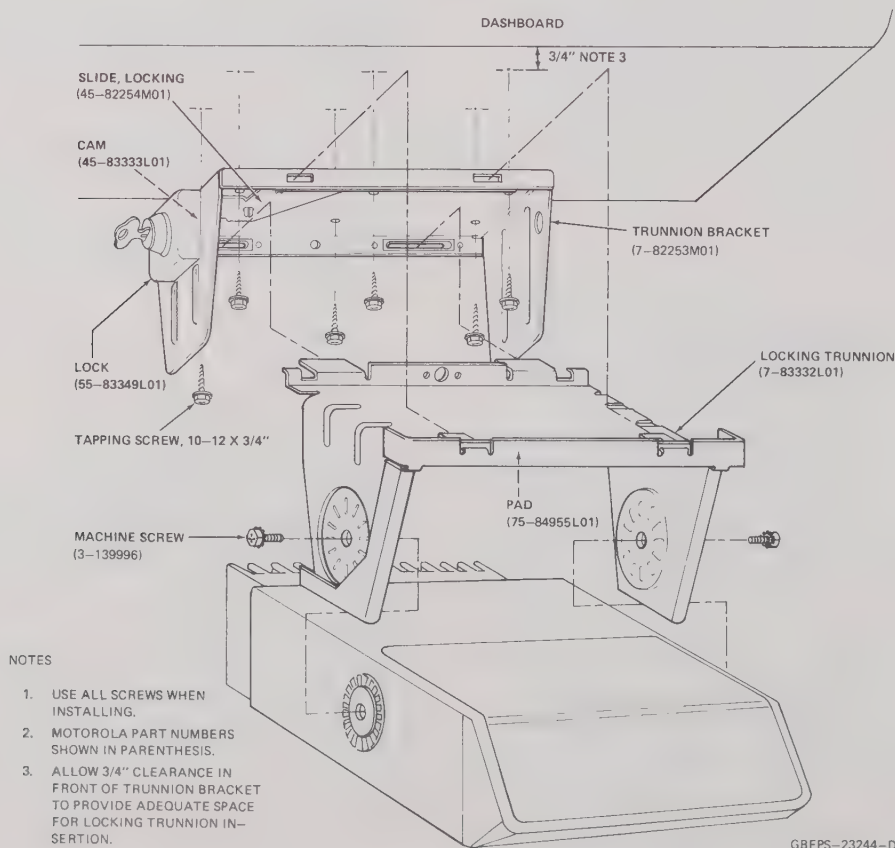


Figure 2
Locking Trunnion Mounting

2. MOBILE RADIOS USING OPTIONAL TRUNNION MOUNTING BRACKET

Step 1. Mount the radio set trunnion mounting bracket. See Figure 3.

Step 2. Mount the antenna, using the instructions provided with the antenna kit. Run the coaxial cable to the intended radio set mounting location. If necessary, cut off the excess cable and install the cable connector.

Step 3. Route power wiring, but do not make power connections and do not tie the wires down. Be sure to use grommets wherever the wiring must pass through a metal panel.

Step 4. Mount the microphone hanger on microphone hang-up box.

Step 5. Connect the power plug and coaxial cable connector to the radio set. See Figure 4. Install the radio in the mounting bracket.

Step 6. Complete the power wire installation. Be sure to leave sufficient slack wire behind the radio set to make the unit easy to remove and reinstall. Strap the wire

down where necessary being sure the wires do not make contact with hot areas on the engine. Be sure the wires cannot be snagged by the operator's feet or during the normal vehicle operation. Cut off the excess power lead length and attach the terminal lugs supplied.

Step 7. If a microphone hang-up box or external speaker is used, secure wiring to those items as needed. Allow sufficient slack in wiring for future maintenance.

Step 8. Connect the power leads. Be sure the connection points are clean and free of paint, dirt, and corrosion.

Step 9. Test radio and its accessories for proper system operation. Check the antenna SWR, using an in-line wattmeter.

CAUTION

After installation, remove the protective film from the escutcheon. To remove any dust accumulation from the escutcheon, always wipe with a damp cloth.

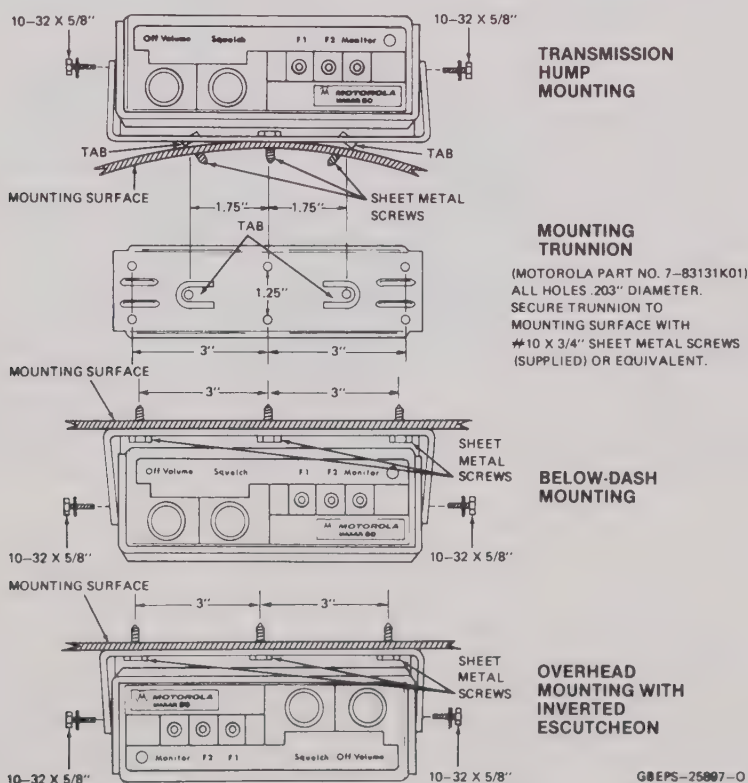


Figure 3.
Radio Mounting Detail

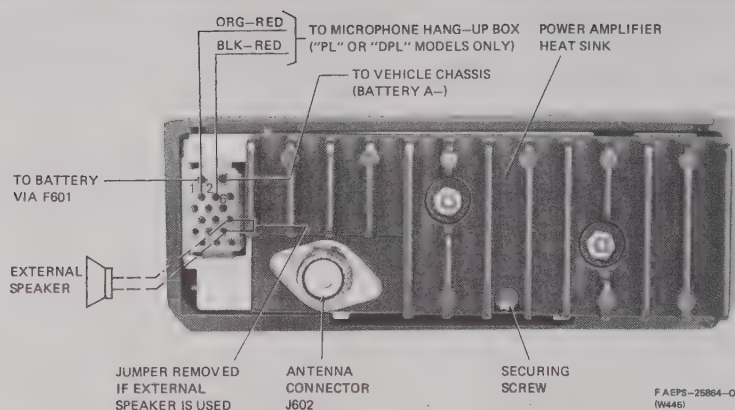


Figure 4.
Connections to Radio Set Rear Panel

3. BASE STATIONS

Step 1. Mount the radio set to the base mounting tray.

Step 2. Prepare radio set power leads as follows: Attach the provided pins to the ends of the red and black power leads. Insert power leads into the mating plug of the base station power supply output jack; red lead pin into position 4 and the black lead pin into position 1.

Step 3. Connect an in-line wattmeter between the radio antenna connector and the antenna system.

Step 4. Plug the base dc power supply into the 117 volt, 60 Hz outlet. Set the AC POWER switch on the power supply to the ON POSITION.

Step 5. Key the transmitter and check the antenna system VSWR. If the VSWR is 3:1 or lower, disconnect the wattmeter and connect the antenna coaxial cable to the radio set antenna jack.

Step 6. Test the radio set and accessories for proper operation. A brief conversation with a mobile unit in your system will indicate whether the base station is operating satisfactorily.

CAUTION

After installation, remove the protective film from the escutcheon. To remove any dust accumulation from the escutcheon, always wipe with a damp cloth.

SERVICE

1. INTRODUCTION

This radio is designed for easy servicing. All of the metering points are brought out to radio set power connector J601. For servicing information, refer to the schematic diagrams, circuit board details, and alignment procedures in this manual. Theory of operation is shown on the schematic diagrams.

2. HOUSING REMOVAL

(Refer to Figure 5)

Step 1. Remove the screws that hold the radio set in the trunnion mount.

Step 2. Insert a screwdriver blade into the screwdriver slot near the bottom of the radio chassis rear panel.

Step 3. Push the screwdriver against the housing until the chassis locking tabs clear the slots in the radio housing.

Step 4. Slide the radio chassis out the back of the housing.

3. WIRE REPLACEMENT—POWER PLUG P601

Two special wire extraction tools are available to remove wires from power plug P601; ST1145 for 0.062" diameter pins (1-15); ST946 for 0.093" diameter pins (A and B). This tool must be used for ease of wire extraction and to prevent damage to the connector or its pins.

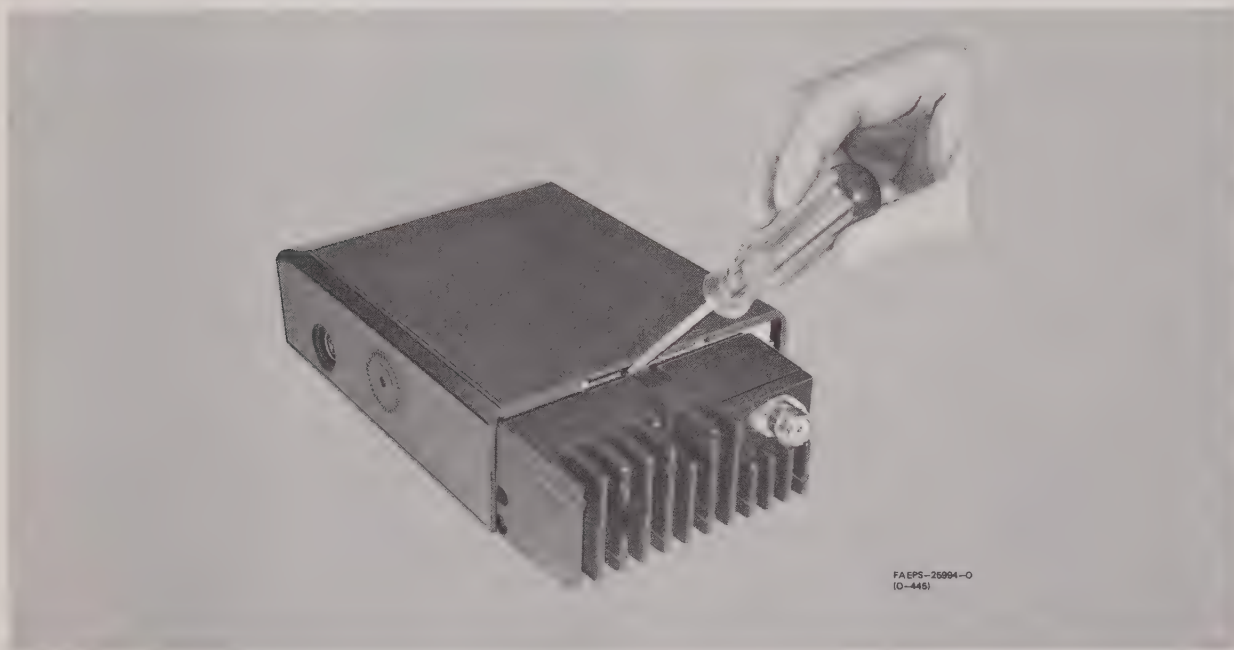


Figure 5
Housing Removal

Required Test Equipment For "MAXAR-80" Radio Servicing

GENERAL TYPE	APPLICATION	RECOMMENDED MODEL	MIN. SPECIFICATIONS
AC-DC VOM	DC voltage measurements, general	Motorola T1009	Measurement range: 0-15 V dc Sensitivity: 20,000 ohms/volt
DC Multimeter	DC voltage readings requires a high input resistance meter	Motorola S1063	Measurement range: 0-15 V dc Input resistance: 11 megohms
AC Voltmeter	Audio voltage measurements	Motorola S1053	Measurement range: 0-10 V ac Input resistance: 10 megohms
RF Voltmeter	RF voltage measurements	Motorola S1339	Measurement range: 100 uV-3 V from 1 MHz-512 MHz Inputs: 50 ohms and high impedance
Oscilloscope	Waveform observation	Telequipment Model D61	Vertical sensitivity: 10 mV-10 V/division Horizontal time base: 1 usec. -1 sec/division
RF Wattmeter	Transmitter output power measurement	Motorola S1350 with appropriate element and T1013 RF Dummy Load	Measurement range: 0-25 Watts
Frequency Meter	Transmitter frequency measurement	Motorola R1200 Series, S1343 Series, or S1344 Series	Measurement range: 136-174 MHz Frequency resolution: 10 Hz
Deviation Meter	Transmitter modulation deviation measurement	Motorola R1200 Series, S1343 Series or S1344 Series	Measurement range: 0-10 kHz deviation Frequency range: 136-174 MHz
RF Signal Generator	Receiver alignment and troubleshooting	Motorola S1329A	Frequency range: 136-174 MHz Output level: 0.1 uV-100,000 uV Must be capable of at least ± 3 kHz deviation when modulated by 1 kHz tone
Audio Signal Generator	Audio Circuit troubleshooting	Motorola S1067	Frequency range: 20 Hz-20 kHz Output level: 50 mV-1 mV
PL Tone Generator*	Tone-Coded "Private-Line" Decoder troubleshooting	Motorola SLN6221	Frequency range: 50 Hz-200 Hz Output level: 0-500 mV
DPL Test Set**	"Digital Private-Line" Encoder-Decoder troubleshooting	Motorola SLN6413	
Radio Test Set w/appropriate metering cable (SKN6029A for TEK-5 and SKN6030A for Portable Test Set)	Meter reading at circuit metering points for alignment and troubleshooting	Motorola S1056-59 Portable Test Set, TEK5B or C Metering Panel with TEK40 Conversion Kit, or TEK5E Metering Panel. See Figure 4	See Figure 4
10.7 MHz Signal Source	Adjustment of receive frequency	Motorola R1200 Series	1 mV output
Tuning Tool Kit	Receiver and transmitter alignment	Motorola TRN6210A	

* Required for tone-coded "Private-Line" Models only

** Required for "Digital Private-Line" Models only

HOW TO USE MODELS S1056-59 PORTABLE TEST SET WITH SKN6030A METERING ADAPTER CABLE

METERING POINT	TEST SET METER SELECTOR SWITCH POSITION	RCVR-XMTR ACCESSORIES SWITCH POSITION	METER OFF-REV SWITCH POSITION	REMARKS
1	1	RCV	REV	
2	2	RCV	REV	
3	3	XMTR	REV	
5	7	XMTR	OFF	S1 IN POSITION M5 (A)
7	7	XMTR	OFF	S1 IN POSITION M7 (B)
RCVR AUDIO	11	RCVR	OFF	2 V AC OR 0.2 V AC METER RANGE

RADIO MUST BE KEYED WITH "XMTR ON" BUTTON ON TEST SET WHEN TEST CABLE IS CONNECTED.

HOW TO USE TEK-5 METERING PANEL WITH SKN6029A ADAPTER CABLE

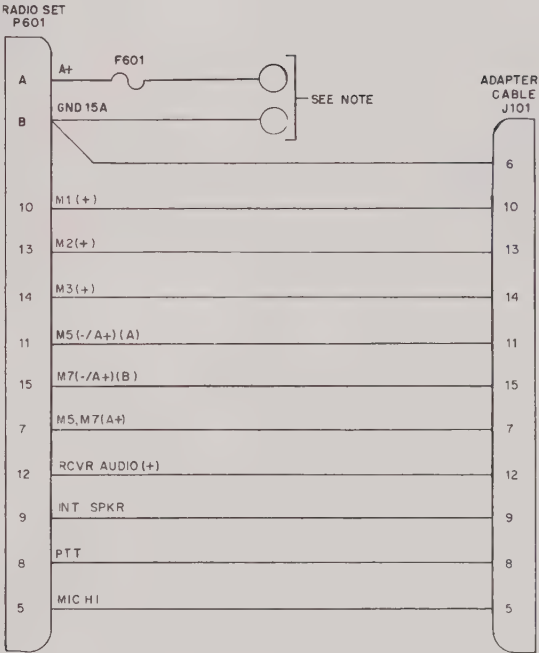
1. SET TEK-5 SELECTOR SWITCH TO POSITION C.
2. SET TEK-5 XMIT-REC SWITCH TO REC POSITION FOR M1, M2, AND RCVR AUDIO. SET XMIT-REC SWITCH TO XMIT FOR M3, M5 AND M7.
3. DURING "IDC" ADJUSTMENT RADIO MUST BE KEYED WITH "KEY" BUTTON IF AUDIO IS APPLIED AT CABLE MIC AUDIO INPUT.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
---------------------	----------------------	-------------

PARTS LIST

RPX4028A Adapter Cable		PL-5385-A
J101	15-83292K01 29-84706E04	CONNECTOR, receptacle: includes: HOUSING, 15 pin TERMINAL, female; 9 req'd.
P601	15-83958L01 29-84706E03 29-82335A03	CONNECTOR, plug: includes: HOUSING, 17 pin TERMINAL, male; 9 req'd. TERMINAL, male; 2 req'd.
F601	65-4637	FUSE, cartridge: 20 amp
NON-REFERENCED ITEMS		
	2-9627	NUT, #4; 2 req'd.
	3-114831	SCREW, 4-40 x 3/16; 2 req'd.
	4-7693	LOCKWASHER, #4, 2 req'd.
	29-82607B03	LUG, ring; 2 req'd.
	15-83957L01	HOUSING, 17 pin
	29-82336A03	TERMINAL, female; 2 req'd.
	30-82020H01	CABLE, 12 conductor
	42-10217A02	CABLE, tie
	42-80313A05	STRAIN RELIEF

SKN6029A and SKN6030A Metering Adapter Cable		PL-4075-A
C1	23-82783B10	CAPACITOR, fixed: 1 uF ±20%; 50 V (not supplied)
F1	65-86099	FUSE, cartridge: 7.5 amp
J602	15-83292K01 29-84706E04	CONNECTOR, receptacle: includes: SHELL, female; 2 contact TERMINAL, 2 req'd.
P1	9-855266	CONNECTOR, plug: female; 20 contact
P601	15-80315A39 29-84706E03	includes: INSULATOR, 15-circuit TERMINAL, male; 12 req'd.
R1	6-124A89	RESISTOR, fixed: 1/4 W; 47k ±5%
R2	6-10621E24	232k, 1%
R3	6-124C23	82 ±10%
R4	6-124A79	18k ±5%
S1	40-82148F01	SWITCH: spdt
XF1	14-82882A01 14-82883A01 42-82884A01	FUSEHOLDER: BODY, fuseholder CAP, fuseholder CLIP, fuseholder; 2 req'd.



RPX4028A ADAPTER CABLE FOR USE WITH SKN6030A AND SKN6029A METERING ADAPTER CABLES

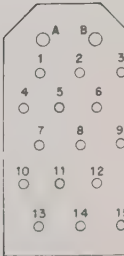
- NOTE:
1. WHEN USING THE RPX4028A, POWER CONNECTIONS FOR A+ AND GND ARE MADE VIA P601-A AND P601-B. POWER CONNECTIONS AVAILABLE WITH THE SKN6029A AND SKN6030A METERING ADAPTER CABLES ARE NOT USED.

WHEN USING THE SKN6029A, MAKE POWER CONNECTIONS AS FOLLOWS:

1. ATTACH P601-A RING LUG TO POSITIVE TERMINAL OF BENCH POWER SUPPLY OF PROPER TYPE
2. ATTACH P601-B TO NEGATIVE TERMINAL OF BENCH POWER SUPPLY

WHEN USING THE SKN6030A, POWER CONNECTIONS ARE MADE VIA THE VEHICLE POWER CONNECTOR. IN THESE CASES, THE RPX4028A ADAPTER CABLE MUST BE MODIFIED AS FOLLOWS.

1. REMOVE RING LUGS FROM P601-A AND P601-B
2. ATTACH LEADS FROM P601-A AND P601-B TO POSITIONS A AND B RESPECTIVELY OF SUPPLIED 17 PIN CONNECTOR (MOTOROLA PART NO. 15-83957L01, DETAIL SHOWN BELOW)
3. MAKE POWER CONNECTIONS BY CONNECTING THE NEW 17-PIN CONNECTOR TO THE VEHICLE POWER CONNECTOR.



TEST EQUIPMENT

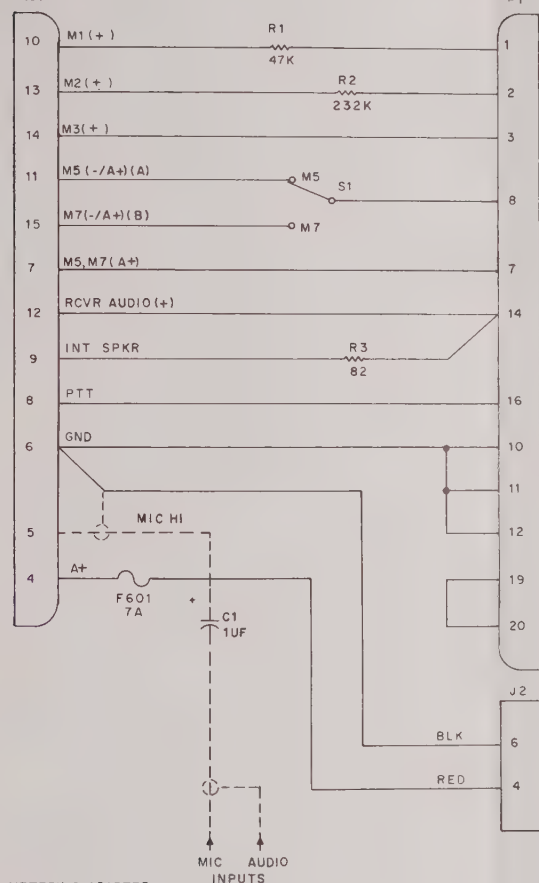
METERING ADAPTER CABLES AND ADAPTER CABLE

TO
ADAPTER
CABLE
J101

METERING ADAPTER
CABLE

P101

TEST SET



TO 20-PIN
TEST CABLE
RECEPTACLE
ON PORTABLE
TEST SET

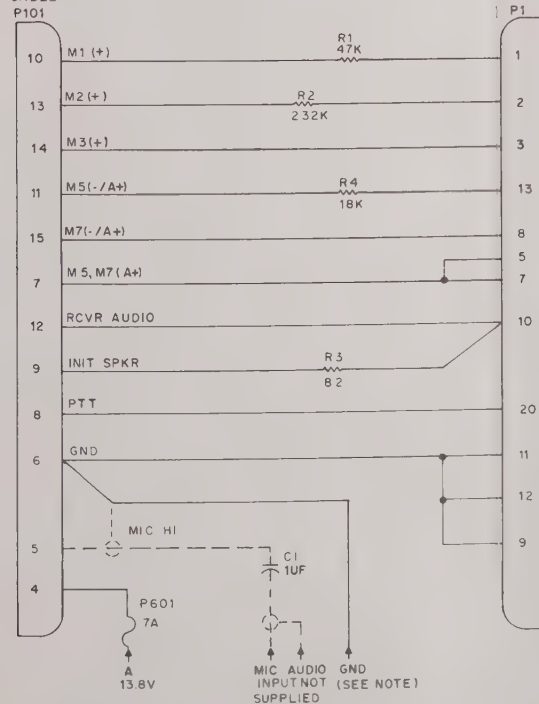
SEE NOTE

TO
ADAPTER
CABLE
J101

METERING ADAPTER
CABLE

P101

TEST SET



TO 20-PIN
TEST CABLE
RECEPTACLE
ON METERING
PANEL

DEPS-23717-0

SKN6029A METERING ADAPTER CABLE FOR USE WITH MODEL TEK-5B OR C
METERING PANEL, EQUIPPED WITH TEK-40 CONVERSION KIT OR TEK-5E METERING PANEL

Motorola No. PEPS-25867-O
5/1/78-VG

TEST EQUIPMENT, METERING ADAPTER CABLES AND ADAPTER CABLE

TRANSMITTER ALIGNMENT PROCEDURE

TRANSMITTER METERING

Transmitter Meter Readings, Using
TEK-5 Metering Panel or S1056B Portable Test Set

METER	MEASUREMENT	READING,(uA)	REMARKS
3	Buffer Amplifier Input	8 (MIN)	
5	Exciter Amplifier Collector Current	25(TYP.) 40 (MAX)	
7	PA Current	11 (TYP.) 17 (MAX)	Multiply M7 x 0.336 to obtain PA Final Current in Amps

Transmitter Meter Readings With 20,000 Ohm/Volt Voltmeter

METERING FUNCTION	VOLTMETER LEAD CONNECTIONS		VOLTMETER SCALE	TYPICAL READING
	+	—		
M3 Buffer Ampl. Input	J601-14	Chassis Ground	50 uA, DC	8 uA min.
M5 Exciter Output Am- plifier Collector Current	J601-7	J601-11	100 mA, DC	17 mA. Typ. 100 mA. Max.
M7 PA Current	J601-7	J601-15	500 mA, DC	270 mA Typ. 385 mA Max.

PREALIGNMENT NO

1. In some cases, peak re
slug is nearest top of co
2. Unnecessary tuning a
needed. Complete tran
 - a. After changing tra
 - b. After replacing a c
3. Before beginning a cor
 - a. Set L120 7 turns fr
 - b. Set C210 1/4 turn
 - c. Set L110 (and L11

Low or no meter 3 re

- d. Set L112, L113, L

- e. Set power set cor
transmitter power

4. Key transmitter for eac
an unaligned transmitt
5. Two-frequency radios
6. Transmitter frequency
 $f_c = 9 f_{osc.}$, where f_c

TRANSMITTER

ES

ings may occur at two points in the tuning range of a coil. Always choose point where form (away from circuit board).

ustments should be avoided. Usually, only a "touch-up" transmitter alignment is needed in the following cases:

mitter operating frequency.
omponent in a frequency-sensitive network.

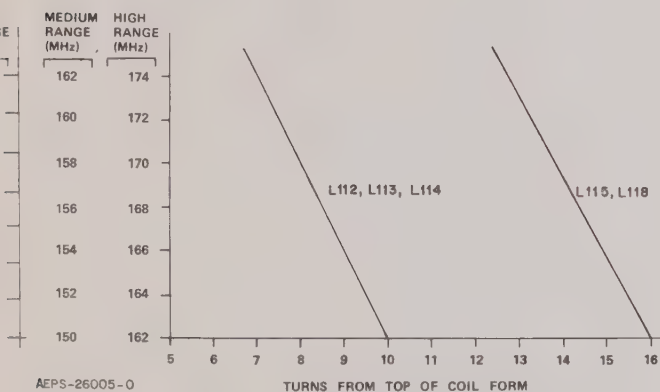
plete alignment, preset tuning adjustments as follows:

n top of form.
ounterclockwise from tight.
n 2-frequency models) 7 turns from circuit board.

CAUTION

ing will be obtained if L110 and L111 are not properly preset.

4, L115, and L118 according to the following chart:



rol R804 fully counterclockwise (viewed from solder side of board) for maximum output.

step in alignment procedure and de-key after alignment step is completed. Avoid keying for prolonged periods.

ould be aligned on lowest operating frequency.

calculations:

= carrier frequency, and f_{osc} = crystal oscillator frequency.

SET-UP

1. If a TEK-5 Metering Panel or a S1056B Po J601 using the appropriate metering adapter shown in Figure 6. Metering may be accomplished if a metering panel is not available. Refer to the metering panel is not available. Refer to the metering panel is not available.
2. Connect an rf wattmeter, terminated in a resistor, to the connector J602.
3. Connect a dc power supply to the power lead.

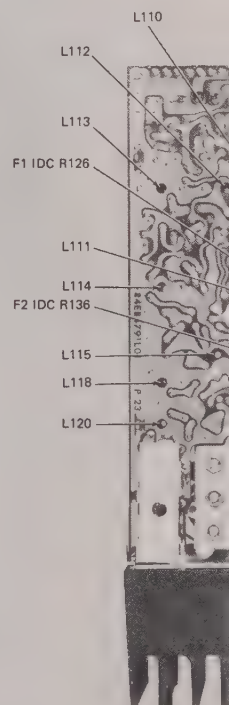
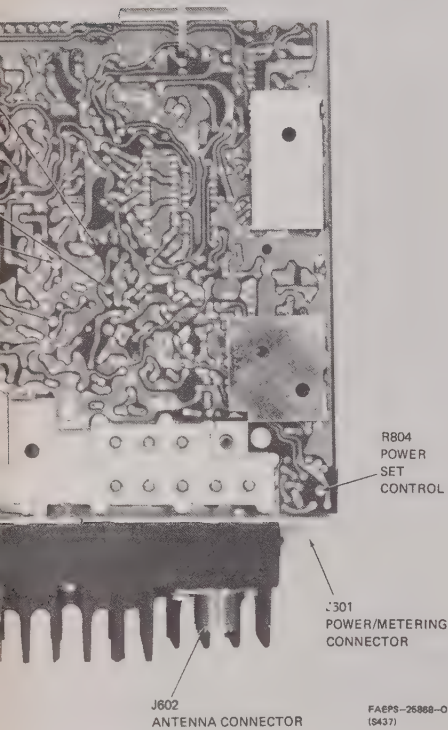


table Test Set is available, connect the metering panel or test set to cable. The metering adapter cables and directions for their use are lished with a 20,000 ohm-per-volt voltmeter if a test set or metering ables on this page.

onant antenna or 50-ohm resistive dummy load, to radio set antenna

s of the test cable. Set the power supply output to 13.8 volts.



TRANSMITTER ALIGNMENT

NOTE
Two-frequency radios should be tuned on lower frequency except where indicated.

STEP	ADJUST	METERING POINT	DESIRED READING
1. Oscillator Output	L112 then L113	M3	Peak
2. Buffer Output	L114	M3	Dip if no M5 reading
		M5	Peak if M5 has a reading
3. First Tripler Output	L115 then L118	M5	Peak
4. Exciter Output	L120	Wattmeter	Peak if wattmeter has reading
		M5	Peak if no wattmeter reading
5. Final Output	C210	Wattmeter	Peak
6. Final Output	L112, L118, L120	Wattmeter	Peak
7. Oscillator Output	L112	Wattmeter	Adjust for 15 watts output
8. Exciter Output	L120 then L118	Wattmeter	Peak on higher frequency. If wattmeter reading is greater than 20 watts, repeat Step 7
9. Oscillator	L112	M3	Peak on higher frequency
10. Final Output	C210	Wattmeter	Retune for maximum power output
11. Power Output	R804	Wattmeter	Adjust R804 to reduce power output to 28 watts. For widespaced operation, set R804 so that the channel with the lowest power output is 28 watts
12. Close power amplifier housing and tighten heatsink to chassis			
13. Power Output	R804	Wattmeter	Repeat Step 11. Keep M7 below 17 uA

NOTE
If the maximum power output obtainable is less than 28 watts, go back to Step 2 of the exciter alignment procedure and repeat the alignment a second time. If the maximum obtainable power output is still below 28 watts, proceed as follows:

IF MAXIMUM IS BETWEEN 26 AND 28 WATTS:
Set R804 so that power output just begins to drop (less than 1/2 watt).

IF MAXIMUM IS LESS THAN 25 WATTS:
The transmitter may be malfunctioning. Refer to the transmitter schematic diagram for troubleshooting information

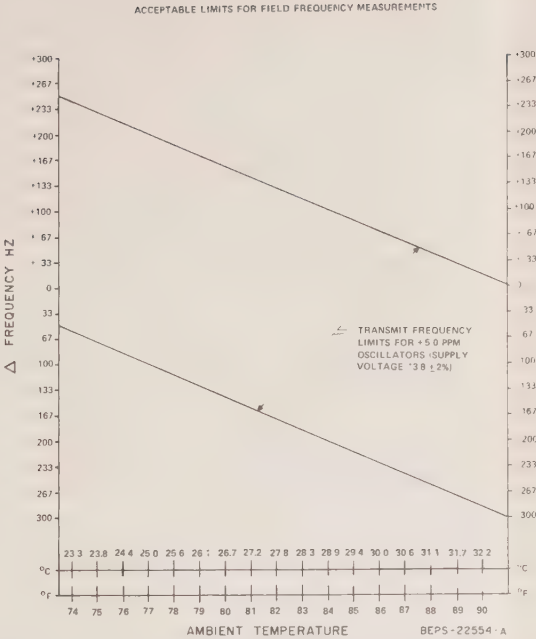


25-Watt PA Adjustment Locations

OSCILLATOR FREQUENCY ADJUSTMENT

Oscillators should be set on frequency AFTER transmitter has been aligned and BEFORE modulation deviation is set.

NOTE
The transmit frequency of this radio should only be adjusted when the ambient temperature is 82°F (28°C). Because of temperature and voltage variations between factory and field locations, the frequency measured may not correspond to the assigned frequency. If the measured frequency is between the limits shown on the graph given below make no attempt to correct the frequency.



If the measured frequency does not fall within the limits shown on this graph, it is recommended that the radio be returned to a room temperature environment (approximately 82°F, 28°C) and the frequency reset using the procedure described below.

SET-UP

- Set up the frequency meter or counter controls as required.
- In tone-coded "Private-Line" (PL) radios, remove the "Vibrasponder" resonant reed from its socket on the PL board.
In "Digital Private-Line" (DPL) radios, set encoder amplitude to zero by adjusting R342 (fully CCW from plating side of board).

Frequency Adjustment Procedure	
STEP	PROCEDURE
1	Select F1
2	Key transmitter with no modulation
3	Adjust L110 for F1 frequency ± 100 Hz
Two-Frequency Models Only	
4	Select F2
5	Adjust L111 for F2 frequency ± 100 Hz

TRANSMITTER ALIGNMENT PROCEDURE (cont'd.)
IDC ADJUSTMENT

Oscillator frequency adjustment must be made BEFORE setting the IDC controls

SET-UP

- Set the deviation meter operating controls as needed.
- In tone coded "Private-Line" radios, remove the "Vibrasponder" resonant reed from its socket on the PL board.
In "Digital Private-Line" radios, set encoder amplitude to zero by adjusting R342 (fully CCW from plating side of board.)
- Disconnect mic input lead (red) from main circuit board.
- Connect the output of an audio signal generator to J601 as follows:
High side through a 1 uF capacitor (+ end toward the radio) to J601-5.
Low side to J601-6 or radio chassis.

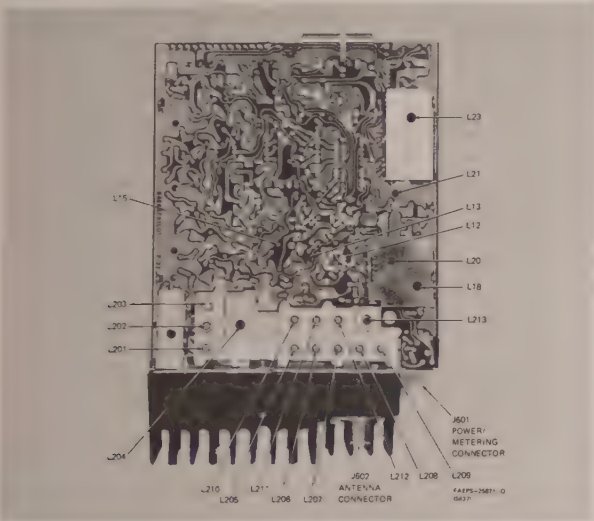
NOTE
The transmitter must be keyed by pressing the KEY button on the test set or by shorting J601-8 to J601-6 or the radio chassis. DO NOT USE THE MICROPHONE PTT SWITCH TO KEY THE TRANSMITTER DURING IDC ADJUSTMENT.

- Connect an ac VTVM across the audio signal generator output.

IDC Adjustment Procedure	
STEP	PROCEDURE
1	Set audio signal generator output frequency to 1000 Hz and output level to 0.8 V.
2	Select F1 and key transmitter. Adjust F1 "IDC" control R126 for ±5 kHz deviation meter reading.
3	On 2-freq. models, select F2 and key transmitter. Adjust F2 "IDC" control R136 for ± 5 kHz deviation meter reading.
4	Reduce audio signal generator output level until deviation meter reads ± 3.0 kHz. Audio oscillator output level should be 160 mV ± 3 dB.
Tone Coded "Private-Line" Models Only	
5	Insert resonant reed into socket on PL board and disconnect audio oscillator from J601.
6	Key transmitter and adjust Tone Level control R433 for PL tone deviation reading of ± 800 Hz.
7	Reconnect audio signal generator to J601-5 and -6 and repeat Steps 1 through 3. Be sure overall deviation does not exceed ± 5 kHz, including PL tone.
or "Digital Private-Line" Models Only (see note)	
5	Disconnect the audio signal generator from J601.
6	Key the transmitter and adjust Code Level set control R342 for a DPL code deviation reading of 900 Hz.
7	Reconnect the audio signal generator to J601-5 and -6. Repeat Steps 5 and 6. Be sure overall deviation does not exceed ± 5 kHz, including DPL code. 1 through 3.

NOTE
DEVIATION MEASUREMENT
To obtain accurate measurement of transmitter deviation in radios equipped with "Digital Private-Line" binary-coded squelch, the frequency response of the deviation measuring equipment must be < 1 Hz. If a deviation meter with this low frequency response characteristic is not available, the transmitter deviation can be checked by making the transmitter send continuous Turn-Off code during the measurement. Since the Turn- Off code waveform is sinusoidal, standard test equipment will then provide an accurate deviation measurement. To make the transmitter send continuous Turn-Off code, short together the base and emitter plating of PTT Inverter Q309 and key the transmitter.

RECEIVER ALIGNMENT PROCEDURE



RECEIVER METERING

Typical Receiver Meter Readings With TEK-5 Metering Panel or S1056-59 Portable Test Set

METER	MEASUREMENT	READING, uA
1	IF Amplifier Signal Level	8-14 (No Signal) 50 (40 uV Input)
2	Quadrature Detector Output	22 ± 1
3	Injection Oscillator Output	18-28 uA

Receiver Meter Readings With 20,000 Ohm/Volt Voltmeter

METERING POINT	VOLTMETER LEAD		TYPICAL READINGS
	CONNECTIONS	VOLTMETER SCALE	
M1 IF Ampl. Signal Level	J601-10 Chassis Ground	2.5 V DC	.25-.5 V (No Signal) 1.75 V (40 uV Input)
M2 Quadrature Detector Output	J601-13 Chassis Ground	10 V DC	5.1 V ± .2 V (5.5 V Using DC Multimeter)
M3 Injection Osc. Output	J601-14 Chassis Ground	50 uA DC	18-28 uA

Motorola No. PEPS-25898-O
5 1 78-VG

RECEIVER

PREALIGNMENT NOTES

- On “Digital Private-Line” and “Private-Line” radio sets, disable the DPL or PL decoder by depressing the front panel MONITOR pushbutton.
- In some cases, peak meter readings may occur at two points in the tuning range of a coil. Always choose point where the slug is nearest the top of the coil form (away from the circuit board).
- Unnecessary tuning adjustments should be avoided. Usually, the receiver will require only a “touch-up” alignment. Complete receiver alignment is necessary in the following cases:
 - After changing the receiver operating frequency.
 - After replacing a component in a frequency-sensitive network.
- Before beginning a complete receiver alignment, preset tuning adjustments as follows:
 - If a PREAMP is used, set L201, 202, 203 fully CCW out of rf deck.
 - Set L205, 206, 207, 208, 209, 210, 211, 212 fully CCW out of rf deck.
 - Set L12, 13, 15 flush with bottom of coil form by turning CCW.
 - Set L213 seven turns clockwise from top of coil.
 - Set L18, 20, 21, 23 flush with bottom of coil form by turning CCW.

5. Receiver frequency calculations:

$$f_{osc} = \frac{f_c - 10.7 \text{ MHz and } f_{inj}}{3} = 3 f_{osc} = f_c - 10.7 \text{ MHz};$$

Where f_c = carrier frequency, f_{osc} = oscillator crystal frequency, and f_{inj} = mixer injection freq.

6. Two-frequency radios should be tuned on the higher operating frequency.

TEST EQUIPMENT SET-UP

- If a TEK-5 Metering Panel or a S1056-59 Portable Test Set is available, connect the metering panel or test set to J601 using the appropriate metering adapter cable. The metering adapter cables and directions for their use are shown in Figure 6. Metering may be accomplished with a 20,000 ohm-per-volt voltmeter if a test set or metering panel is not available. Refer to the voltmeter metering table on this page. Voltage readings with a VOM will not be accurate if metering panel or test set is connected simultaneously.
- Connect a dc power supply to the power leads of the test cable. Set the power supply output to 13.8 volts.

20 DB QUIETING SENSITIVITY MEASUREMENT

- Connect an ac voltmeter across the speaker.
- On PL model radio sets, disable PL by depressing the MONITOR button on the radio set front panel.
- Turn the SQUELCH control fully counterclockwise.
- Turn on the radio set and adjust the VOLUME control until a reading of 2 volts is obtained on the ac voltmeter.
- Connect an rf signal generator to the radio set antenna connector. Set the signal generator to the carrier frequency, and set the generator output level control to minimum.
- Slowly increase the output level of the rf signal generator until the ac voltmeter reads 0.2 volts.
- Note the signal generator output signal level. This signal level is the 20 dB quieting sensitivity of the receiver.

RECEIVER ALIGNMENT PROCEDURE

NOTE

Transmitter alignment must be performed before receiver alignment.

Step	Input Signal	Signal Input Point	Adjust	Monitoring Point	Desired Reading
1	Quadrature Detector 10.7 MHz @ 1 mV	Near Q12; allow signal to “spray” into circuit (Note 1)	L23	Meter 2	22 ± 1 uA
				DC Multimeter at J601-13	or 5.5 V dc
2	Injection Oscillator		Freq Select Switch in “F1”, adjust L13	Meter 3	Peak
			Freq Select Switch in “F2”, adjust L12	Meter 3	Peak
			Freq Select Switch to lowest freq position, then: L15	Meter 3	Max
			L210		Dip
3	Preamp Input	Antenna Connector	L201, 202, 203, 204	Meter 1	Peak. (Adjust signal generator input level to keep M1 in the 25 uA-35 uA range)
					Dip
4	Preselector	Antenna Connector	Set Freq. Select Switch to highest freq. position, then adjust L209, 208, 207, 206, 205	Meter 1	Peak. (Adjust signal generator input level to keep M1 in the 25 uA-35 uA range). Repeat, and then peak M1 by adjusting L213
5	IF Tuning	Antenna Connector	L18, 20, 21	Meter 1	Peak M1 with L18, 20, 21. (Adjust signal generator in put level to keep M1 in the 35 uA-40 uA range). If two peaks are present, choose the one nearest the top of the coil form. Repeat, and then detune L211/2 turn ccw.
6	Injection Touch-Up	Antenna Connector	Set Freq. Select Switch to lowest freq. position, then adjust L15	Meter 1	Detune ccw for a minimum M1
				Meter 1	Peak
7	Fine Freq. Adj.	Antenna Connector	L212, 211, 210; then repeat. L15	Meter 3	Peak
				Radio Speaker	Audio zero beat. Repeat after a 20 minute warmup
			L13 for freq. #1 L12 for freq. #2 (2 freq radios only)		

NOTES:

- With a wire connected to a 10.7 MHz signal source output, “spray” the signal near Q12 (that is, place the wire close to Q12) but do not allow the wire to make physical contact with any part of the i-f amplifier.
- To set signal generator on frequency, either use a counter on the generator output, or use the zero beat method. Do not use meter 2 to set frequency.

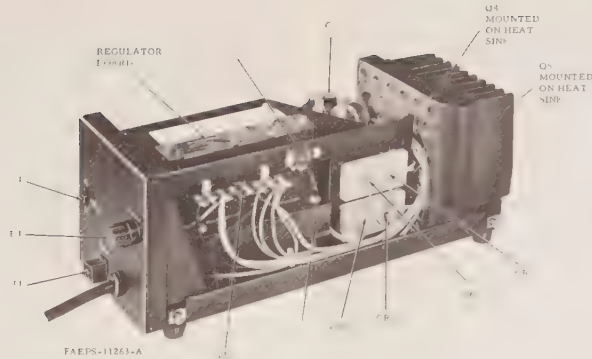
BASE STATION POWER SUPPLY
MODEL TPN1136A

FUNCTION

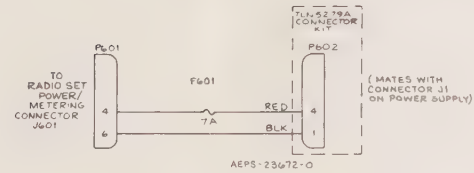
Provides the entire radio with regulated +14.5 V DC when used in a 120 V AC primary power fixed installation.

REFERENCE SYMBOL	PART NO.	DESCRIPTION
PARTS LIST		
TLN5279A Connector Kit		PL-5992-O
P602	15-10183A52 29-82335A01	includes: HOUSING, connector: 6-circuit CONTACT, connector: male: 4 used
TLN5274B Regulator Board		PL-5361-O
C1	8-82905C02	CAPACITOR, fixed: μ F: .022 $\pm$ 10%; 50 V
C3, 4	8-82905C02	.022 $\pm$ 10%; 50 V
C2	23-83908L01	100 $\pm$ 75-10%; 25 V
CR5	48-82392B03	SEMICONDUCTOR DEVICE, diode: (SEE NOTE) silicon
Q1, 2	48-869170	TRANSISTOR: (SEE NOTE) NPN; M9170
R1	6-400812	RESISTOR, fixed: $\pm$ 5%; 1/2 W unless otherwise stated
R2	6-400459	470
R3	6-400422	1.5k
R4	17-82177B40	200, 5 W
R5, 6	6-5593	470 $\pm$ 10%; 1 W
R7, 8	6-6411	1k
R9, 10	6-6320	10k $\pm$ 10% (NOTE: Use is optional; determined at factory)
R11	6-6393	1.2k $\pm$ 10%
VR1	48-83696E01	SEMICONDUCTOR DEVICE, diode: (SEE NOTE) silicon; Zener type: 6.8 V $\pm$ 5%
TRN6282A Power Supply Chassis		PL-3349-D
C1	23-82464C08	CAPACITOR, fixed: 11,000 μ F $\pm$ 75-10%; 35 V
CR1, 2	48-82732C07	SEMICONDUCTOR DEVICE, diode: (SEE NOTE) silicon
CR3, 4	48-82732C10	silicon
J1		CONNECTOR, receptacle: includes: 15-10183A52 INSULATOR, 6-circuit 29-82335A01 CONTACT, male: 4 req'd. (P/O Model TLN5219A)
F1	65-804908	FUSE, cartridge: slow-blow type; 2 A
P1	30-83212F01	LINE CORD: includes: ac plug
Q3	48-869677	TRANSISTOR: (SEE NOTE) PNP; type M9677
Q4, 5	48-869244	NPN; type M9244
S1	40-84622B02	SWITCH, slide: DPS I
T1	25-83594E02	TRANSFORMER, power: pri: res 2.75 Ohm sec: res 0.11 Ohm
TB1	31-121700	TERMINAL STRIP: 8 terminals; No. 2 & 7 mtg.
XF1	9-82083C01	FUSEHOLDER: extractor post type
NON-REFERENCED ITEMS		
	26-84923B03 1-80745B88	HEATSINK HOUSING, power supply

NOTE: Replacement diodes and transistors must be ordered by listed part number only for optimum performance.

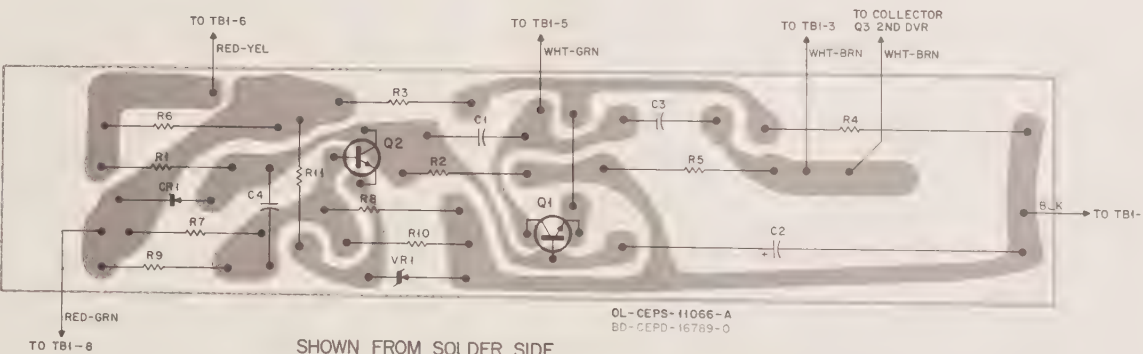


CABLE DETAIL



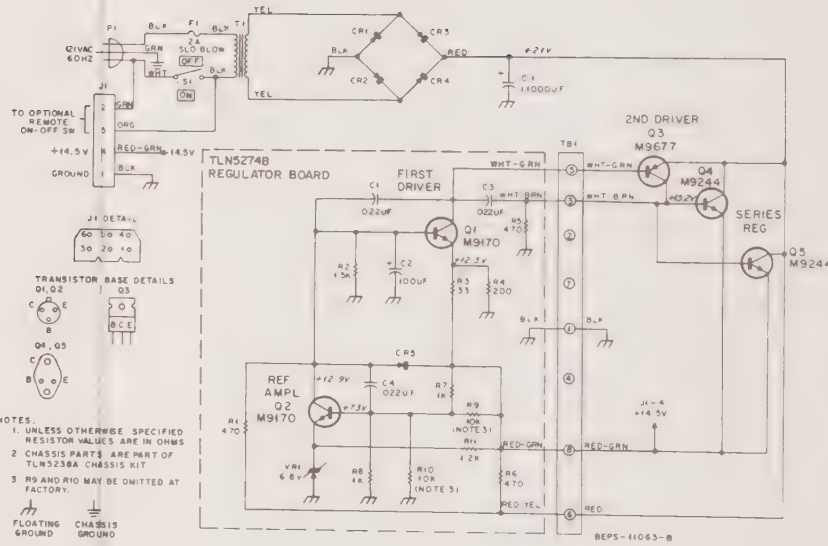
MODEL	SUB-MODEL	VERSION	DESCRIPTION
TPN1136A	TLN5274B	0	REGULATOR BOARD
	TRN6282A	0	POWER SUPPLY CHASSIS
	TLN5279A	0	CONNECTOR KIT

EPS-17211-C



SHOWN FROM SOLDER SIDE

OL-CEPS-11066-A
BD-CEPD-16789-D



NOTES:
1. UNLESS OTHERWISE SPECIFIED
RESISTOR VALUES ARE IN OHMS
2. CHASSIS PARTS ARE PART OF
TLN5238A CHASSIS KIT
3. R9 AND R10 MAY BE OMITTED AT
FACTORY.
FLOATING
GROUND
CHASSIS
GROUND

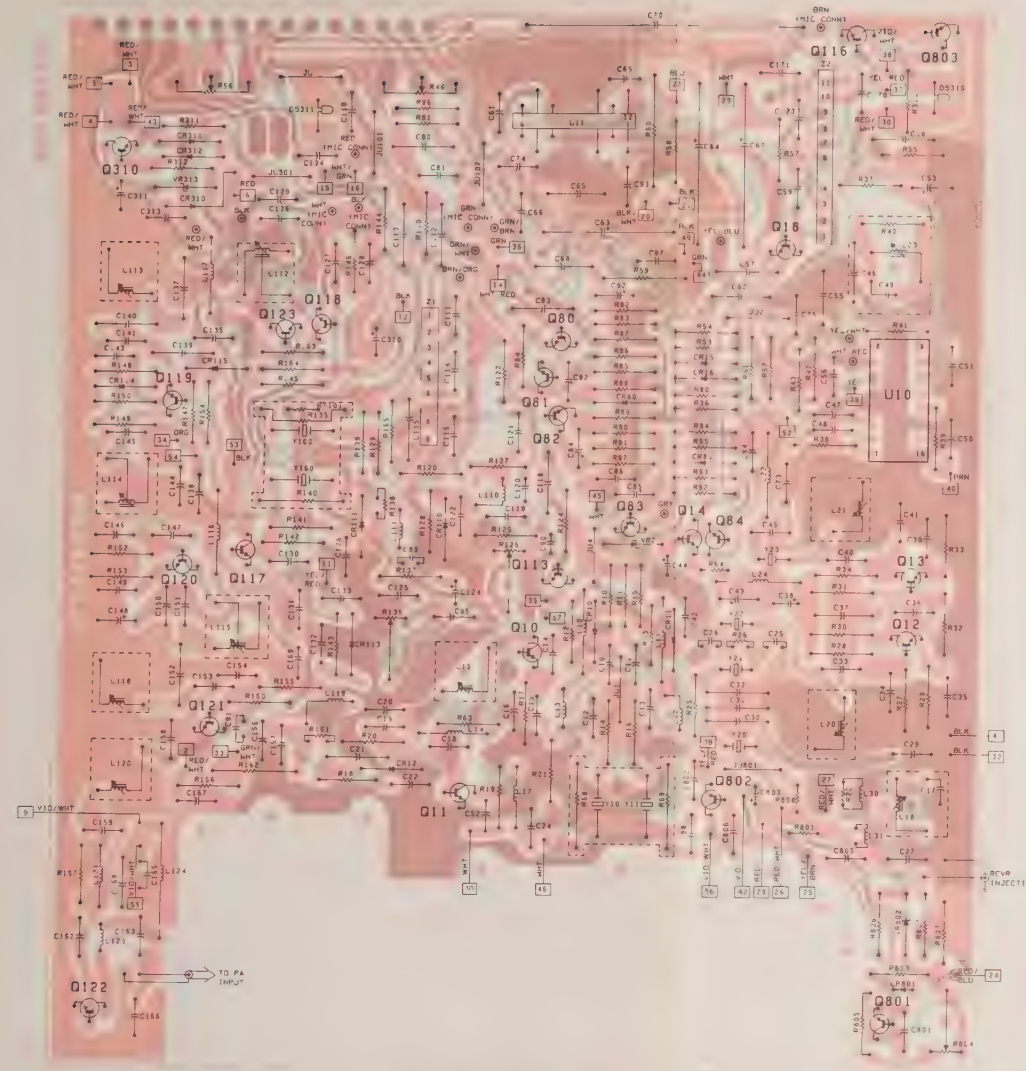
UNIFIED CHASSIS
CIRCUIT BOARD DETAIL

Push-Pin Table

PIN	WIRE COLOR	FUNCTION
PL BOARD CONNECTIONS (WHEN USED)		
C	RED-WHT	SWITCHED A+ TO PL BOARD
D	WHT-RED	PL TONE TO PL BOARD DECODER INPLT
E	YEL-WHT	AUDIO TO PL BOARD HIGH PASS FILTER INPUT
F	YEL-BLK	AUDIO FROM PL BOARD HIGH PASS FILTER OUTPLT
G	GRAY	SQUELCH CONTROL FROM PL BOARD SQUELCH SWITCH
M	GRN-BRN	MIC PTT TO PL BOARD PTT INPLT
N	GRN-WHT	DELAYED PTT FROM PL BOARD
P	BRN-ORG	PL TONE FROM PL BOARD ENCODER OUTPLT
T	BLK	PL BOARD GROUND

Jumper Table

JUMPER NUMBER	IN	OUT
JU1, JU99	SINGLE-FREQUENCY RECEIVER MODELS	TWO-FREQUENCY RECEIVER MODELS
JU2, JU102	CARRIER SQUELCH MODELS	"PRIVATE LINE" SQUELCH MODELS
JU301	NORMALLY IN FOR POWER ON INDICATOR	EXTINGUISHED POWER ON INDICATOR ORTISED WITH QUICK CALL OPTION



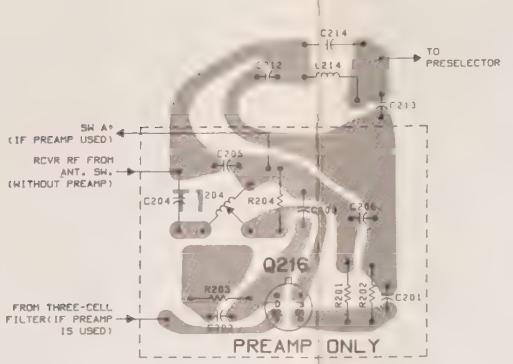
NO	FUNCTION	ON-BOARD SOURCE	COLOR	OFF-BOARD DESTINATION	REMARKS
3	SW A+	R106	RED-WHT	J801-7	FROM 5
4	SW A+ TO 8801 VIA	R311	RED-WHT	---	TO 2
5	SW A+ TO 8803 EMITTER	R311	RED-WHT	---	TO 38
6	SW A+ TO RF AMP	CR010	RED	TO 8311	TO 38
7	RCVR INJECTION	Q104	WHITE	TO PRESELECTOR	TO 38
8	Q103 SELECT	Q103	WHT-RED	---	TO 32
9	C310 GND	C310	BLK	---	MODIFY FOR ANTENNA SWITCH
10	PTT	CR010	WHT-GRN	---	ONLY
11	F1 XMTR SELECT	C129	YEL-BLK	8803-A	ONLY
12	RCVR F2 SELECT	C110	WHT-GRN	TO J801-6	F2 MODELS
13	---	C11	YEL-BLK	8804-B	ONLY
14	---	Q802 EMITTER	YEL-RED	---	TO 37
15	RCVR AUDIO	R801	BLK-WHT	J801-4	---
16	SPEAKER GND	R801	BLK	L8001	---
17	SPEAKER AUDIO	R801	BLU-WHT	L8001	---
18	RCVR AUDIO	R801	WHT	J801-3	---
19	THERMAL SHUTBACK	CR01	RED-BLK	TO C833	---
20	A+	R801	YEL-BRN	TO FINAL PA	---
21	RCVR SWA+	R801	RED-WHT	DRIVER STAGE, FINAL PA	---
22	RCVR SWA+	R801	RED-WHT	FROM 8801	---
23	C310 GND	C39	RED-WHT	TO RF AMP BOARD	---
24	XMTR METER 3	R147	GRN-WHT	---	FROM 4 TO 18
25	RCVR F1 SELECT	JU102	GRN	J801-11	---
26	PTT	Q803 COLLECTOR	YEL-RED	J801-14	---
27	TO 9	Q803 COLLECTOR	YEL-RED	J801-15	---
28	RCVR METER 2	C50	BLK	J801-10	---
29	RCVR METER 1	C50	BLK	J801-15	---
30	QND	R801	YEL	J801-15	---
31	MTR 7	CR01	RED-WHT	FROM 8801	---
32	XMTR GND	CR01	GRN	FREQUENCY SWITCH	---
33	RCVR HEATER JUMPER	R801	WHT	---	TO 48
34	RCVR HEATER JUMPER	R801	WHT	---	FROM 45
35	RCVR GND	CR01	GRN	---	---
36	RCVR GND	CR01	GRN	---	---
37	RCVR GND	CR01	GRN	---	---
38	RCVR GND	CR01	GRN	---	---
39	RCVR GND	CR01	GRN	---	---
40	RCVR GND	CR01	GRN	---	---
41	RCVR GND	CR01	GRN	---	---
42	RCVR GND	CR01	GRN	---	---
43	RCVR GND	CR01	GRN	---	---
44	RCVR GND	CR01	GRN	---	---
45	RCVR GND	CR01	GRN	---	---
46	RCVR GND	CR01	GRN	---	---
47	RCVR GND	CR01	GRN	---	---
48	RCVR GND	CR01	GRN	---	---
49	RCVR GND	CR01	GRN	---	---
50	RCVR GND	CR01	GRN	---	---
51	RCVR GND	CR01	GRN	---	---
52	RCVR GND	CR01	GRN	---	---
53	RCVR GND	CR01	GRN	---	---
54	RCVR GND	CR01	GRN	---	---
55	RCVR GND	CR01	GRN	---	---
56	RCVR GND	CR01	GRN	---	---
57	RCVR GND	CR01	GRN	---	---
58	RCVR GND	CR01	GRN	---	---
59	RCVR GND	CR01	GRN	---	---
60	RCVR GND	CR01	GRN	---	---
61	RCVR GND	CR01	GRN	---	---
62	RCVR GND	CR01	GRN	---	---
63	RCVR GND	CR01	GRN	---	---
64	RCVR GND	CR01	GRN	---	---
65	RCVR GND	CR01	GRN	---	---
66	RCVR GND	CR01	GRN	---	---
67	RCVR GND	CR01	GRN	---	---
68	RCVR GND	CR01	GRN	---	---
69	RCVR GND	CR01	GRN	---	---
70	RCVR GND	CR01	GRN	---	---
71	RCVR GND	CR01	GRN	---	---
72	RCVR GND	CR01	GRN	---	---
73	RCVR GND	CR01	GRN	---	---
74	RCVR GND	CR01	GRN	---	---
75	RCVR GND	CR01	GRN	---	---
76	RCVR GND	CR01	GRN	---	---
77	RCVR GND	CR01	GRN	---	---
78	RCVR GND	CR01	GRN	---	---
79	RCVR GND	CR01	GRN	---	---
80	RCVR GND	CR01	GRN	---	---
81	RCVR GND	CR01	GRN	---	---
82	RCVR GND	CR01	GRN	---	---
83	RCVR GND	CR01	GRN	---	---
84	RCVR GND	CR01	GRN	---	---
85	RCVR GND	CR01	GRN	---	---
86	RCVR GND	CR01	GRN	---	---
87	RCVR GND	CR01	GRN	---	---
88	RCVR GND	CR01	GRN	---	---
89	RCVR GND	CR01	GRN	---	---
90	RCVR GND	CR01	GRN	---	---
91	RCVR GND	CR01	GRN	---	---
92	RCVR GND	CR01	GRN	---	---
93	RCVR GND	CR01	GRN	---	---
94	RCVR GND	CR01	GRN	---	---
95	RCVR GND	CR01	GRN	---	---
96	RCVR GND	CR01	GRN	---	---
97	RCVR GND	CR01	GRN	---	---
98	RCVR GND	CR01	GRN	---	---
99	RCVR GND	CR01	GRN	---	---
100	RCVR GND	CR01	GRN	---	---

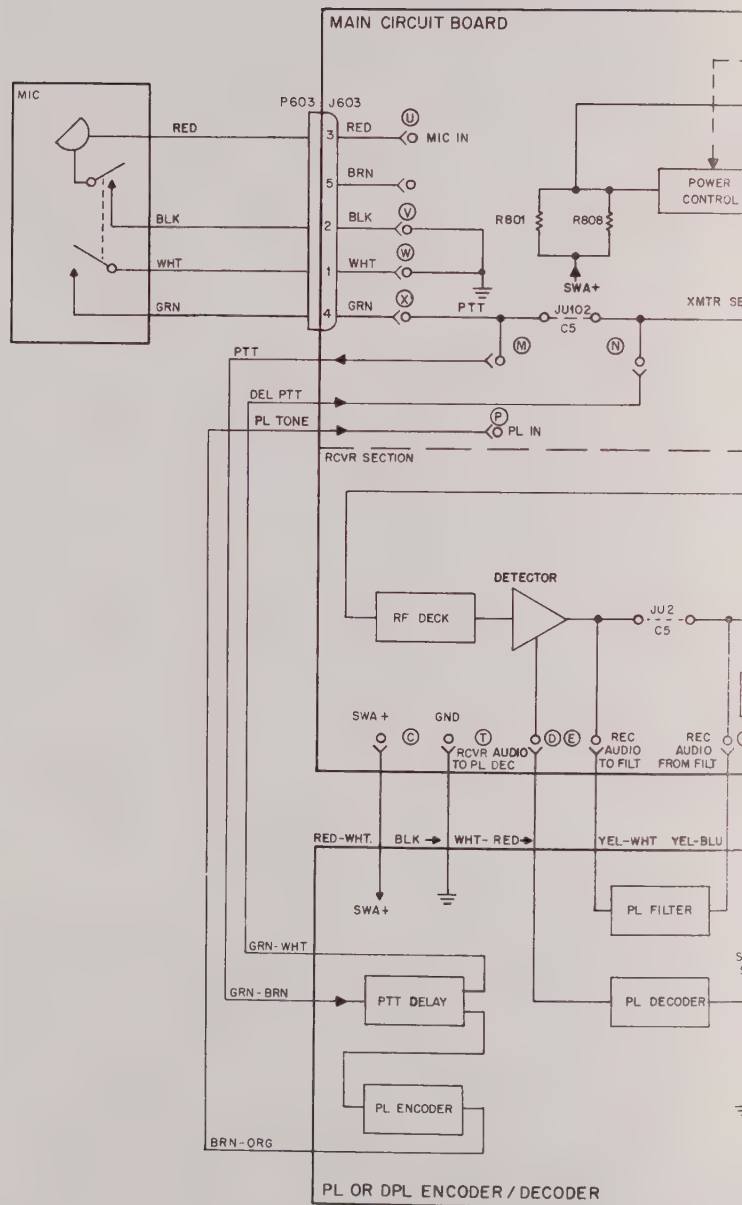
NOTES

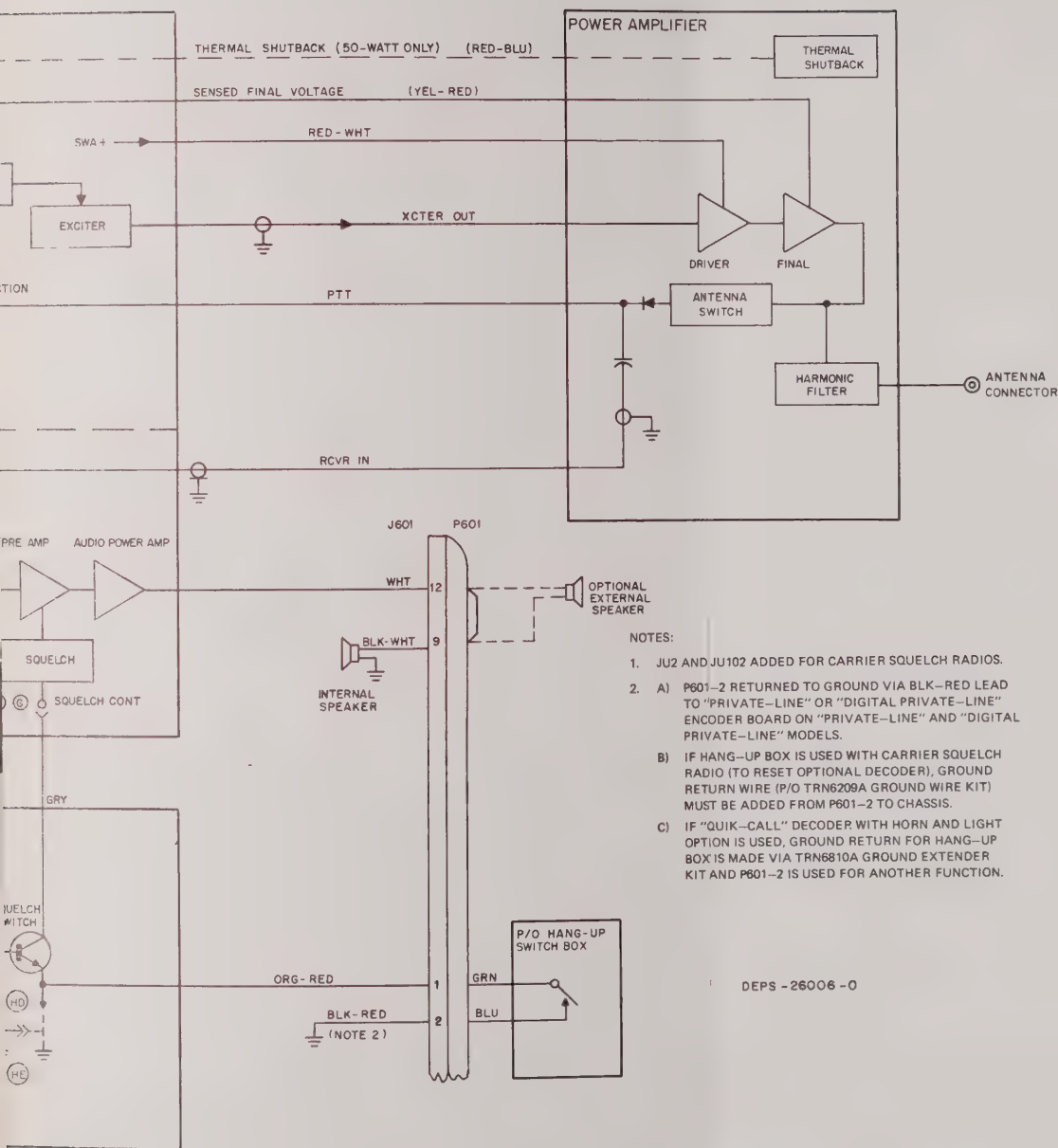
1. [Symbol] INDICATES MAIN PRINTED CIRCUIT BOARD WIRING. REFER TO TABLE 1 FOR DETAILS.

2. BUBBLE LEAD PINS (DENOTED BY @) ARE LABELED FOR JUMPER WIRE COLOR AND USED FOR "PRIVATE LINES" AND MICROPHONE CONNECTIONS.

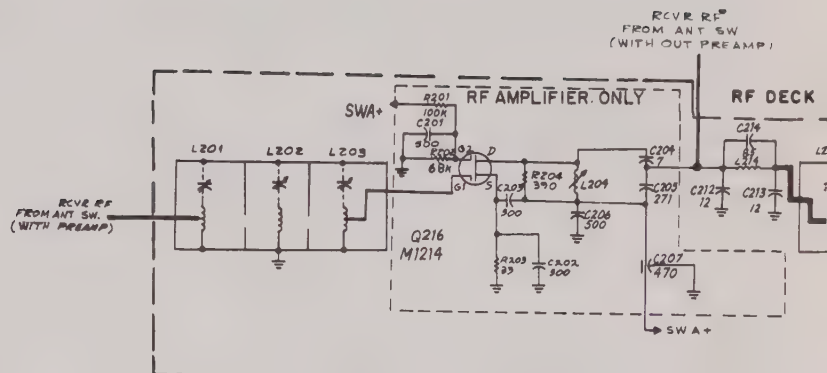
RF AMPL AND LOW PASS FILTER





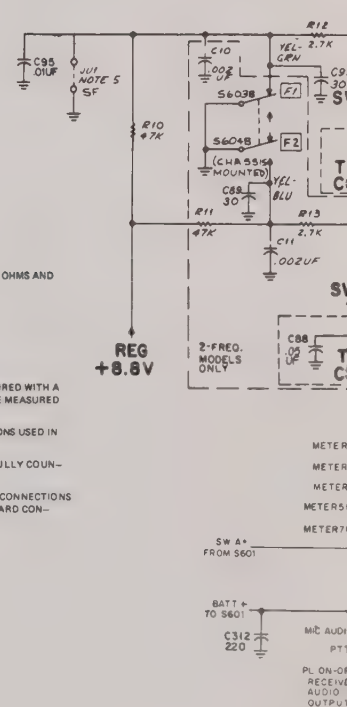


"Maxar-80" VHF
Functional Interconnect Diagram
Motorola No. DEPS-26006-O
5/1/78-VG



NOTES:

1. REFER TO PARTS LIST FOR COMPONENT VALUES.
2. UNLESS OTHERWISE NOTED, RESISTOR VALUES ARE IN OHMS AND CAPACITOR VALUES ARE IN PICO FARADS.
3. VOLTAGE NOTATIONS ARE AS FOLLOWS
T = TRANSMITTER KEYED
R = RECEIVER (TRANSMITTER UNKEYED)
U = RECEIVER UNSQUELCHED
S = RECEIVER FULLY SQUELCHED
4. UNLESS OTHERWISE NOTED, DC VOLTAGES ARE MEASURED WITH A 20,000 OHM/VOLT VOLTMETER, AND RF VOLTAGES ARE MEASURED WITH AN RF VOLTMETER.
5. REFER TO THE JUMPER TABLE FOR JUMPER CONNECTIONS USED IN VARIOUS RADIO MODELS.
6. U11 VOLTAGES MEASURED WITH VOLUME CONTROL FULLY COUNTERCLOCKWISE (MINIMUM VOLUME).
7. NUMBER DESIGNATORS ARE USED FOR INTRA-RADIO CONNECTIONS AND LETTER DESIGNATORS ARE USED FOR INTRA-BOARD CONNECTIONS.



REG +8.8V

2-FREQ. MODELS ONLY

SW A+ FROM S601

BATT + TO S601

C312 220

MC AUDI PT1

PL ON-OFF RECEIVE AUDIO OUTPUT

RADIO SET PARTS LIST

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
------------------	-------------------	-------------

TLD5821A Main Board; 1-Freq. (136-150.8 MHz)
TLD5831A Main Board; 2-Freq. (136-150.8 MHz)
TLD5822A Main Board; 1-Freq. (150.8-162 MHz)
TLD5832A Main Board; 2-Freq. (150.8-162 MHz)
TLD5823A Main Board; 1-Freq. (162-174 MHz)
TLD5833A Main Board; 2-Freq. (162-174 MHz) P L-5882-O

NOTE: This parts list covers six models of the Main Board. Where differences exist, a letter code is added to the reference symbol to indicate the frequency range of the applicable unit. A notation in the Description column indicates when the unit is a 2-frequency model.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
------------------	-------------------	-------------

TMN6134A Microphone PL-5890-O

DP601	59-82933C02 or 59-83272C01	CARTRIDGE, microphone: preamplifier dynamic; includes transistor
W601	30-852742 41-835707 29-83277G01 29-83277G04	CORD, microphone: coiled; 4-conductor; includes SPRING, strain relief TERMINAL, pin (4 req'd.) TERMINAL, pin (8 req'd.)
J603		CONNECTOR, plug; includes
S604	15-82062M01 28-82005H01 43-82063M01	HOUSING PLUG, microphone COLLAR
	40-82263G02	SWITCH, push; dpst

NON-REFERENCED ITEMS		
33-82599D01	NAMEPLATE	
13-84599B02	EMBLEM	
38-84559B03	PUSHBUTTON	
3-132436	SCREW, machine: No. 6-32 x 13/16"; 3 req'd.	
4-7669	WASHER, lock: No. 6 split; 3 req'd.	
4-114201	WASHER, flat: 1/4" x 0.156" x 0.015"; 3 req'd.	
1-80710D23	HOUSING, microphone: includes HOUSING, microphone (front)	
15-82701B23	HOUSING, microphone (rear)	
15-82701B13	HOUSING, microphone (rear)	
3-129498	SCREW, lock: No. 6-32 x 5/16" "Phillips" round head	
4-7666	LOCKWASHER, No. 6 external	
42-852710	STRAP, strain relief	
3-124693	SCREW, lock: No. 6-32 x 1/4" "Phillips" round head; 2 req'd.	
42-82702B02	RETAINER, cartridge	
32-82703B01	GASKET, neoprene	

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
------------------	-------------------	-------------

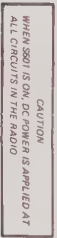
C66	21-82187B18	.0015 uF ±10%; 100 V
C67	23-84669A19	100 uF -10+150%; 20 V
C68	8-84496D05	0.1 uF ±20%; 100 V
C69	21-82877B05	150 pF ±10%; 75 V
C70	23-83210A19	500 uF -10+100%; 20 V
C71, 72		NOT USED
C73	21-84494B08	170
C74	21-83596E10	220 ±20%
C75	21-82610C03	47; 200 V
C76 thru 79		NOT USED
C80	8-84496D05	0.1 uF ±20%; 100 V
C81	21-82187B18	.0015 uF ±10%; 100 V
C82	21-865452	680 ±10%
C83	8-84496D07	.022 uF ±10%; 100 V
C84	23-84538G02	4.7 uF ±20%; 20 V
C85	23-84538G04	15 uF ±20%; 20 V
C86, 87, 88	21-82372C04	.05 uF ±80-20%; 25 V
C89	21-864521	30 ±10%; 75 V (2-freq.)
C90, 91	21-864521	30 ±10%; 75 V
C92	23-84538G04	15 uF ±20%; 20 V
C93	21-82372C04	220 ±20%
C94	21-83596E10	0.1 uF ±80-20%; 25 V
C95	21-82428B04	.01 uF ±70-30%; 100 V
C96 thru 109		NOT USED
C110, 111	21-83596E10	220 ±20%
C112, 113	8-82905G08	.033 uF ±10%; 50 V
C114	21-83596E10	220 ±20%
C115	8-82905G10	.015 uF ±10%; 50 V
C116	21-83596E35	.005 uF; 200 V
C117		NOT USED
C118	8-82905G21	.018 uF
C119	21-82187B18	.0015 uF ±10%; 100 V
C120	23-84665F04	1 uF ±150-0%; 50 V
C121	21-850510	470 ±10%; 300 V
C122L, M	21-82204B51	62; 100 V
C122H	21-82610C21	62; 200 V
C123	21-82372C04	.05 uF ±80-20%; 200 V
C124	23-84665F04	1 uF -10+100%; 50 V (2-freq.)
C125	21-850510	470 ±10%; 300 V (2-freq.)
C126L, M	21-82204B51	62; 100 V (2-freq.)
C126H	21-82610C21	62; 200 V (2-freq.)
C127	21-84494B52	91
C128	21-84494B15	300
C129	21-82428B59	.01 uF -20+80%; 200 V
C130	21-84494B52	91 (2-freq.)
C131	21-84494B15	300 (2-freq.)
C132	21-82428B59	.01 uF -20+80%; 200 V (2-freq.)
C133	21-83596E10	220 ±20%; (2-freq.)
C134	21-83596E10	220 ±20%
C135	21-82428B59	.01 uF -20+80%; 200 V
C136L	21-82204B29	43 ±3%; 200 V
C136M	21-82133G39	36
C137L	21-82133G75	30
C137H	21-82450B16	.62
C137M	21-82450B29	.51
C137H	21-82450B29	.51
C138	21-82187B20	.001 uF ±10%; 100 V
C139L, M	21-82450B10	4.3
C139H	21-82450B11	3.0
C140L	21-82133G35	56
C140M	21-83406D18	47
C140H	21-82133G39	36
C141	21-82204B54	150; 200 V
C142		NOT USED
C143	21-82428B59	.01 uF -30+70%; 100 V
C144, 145	21-82372C04	.05 uF ±80-20%; 25 V
C146L	21-82187B08	220 ±10%
C146M	21-82204B54	100; 200 V
C146H	21-82610C44	100; 100 V
C147L	21-82610C29	51 ±10%
C147M	21-82610C03	47; 200 V
C147H	21-83406D42	43
C148	23-84638G04	15 uF ±20%; 20 V
C149, 150	21-83596E10	220 ±20%
C151L	21-82133G21	10 ±0.5 pF
C151M	21-82133G22	8 ±0.5 pF
C151H	21-82133G26	6 ±0.5 pF
C152L	21-82450B16	.62 ±10%; 100 V
C152M, H	21-82450B29	0.51
C153L	21-82989E31	14 ±2.5%
C153M	21-82133G21	10 ±0.5 pF
C153H	21-82133G22	8 ±0.5 pF
C154	21-82133G41	4.7 ±0.25 pF
C155		NOT USED
C156	21-83596E10	220 ±20%

MOTOROLA PART NO.	DESCRIPTION	REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
21-82372C04	.05 uF +80-20%; 25 V	L122	24-84881C05	NOT USED
21-83406D87	43	L123	24-800484	2-3/4 turns
21-82133G14	7.5 ±0.5 pF	L124		.31 uH
21-83406D64	5.6 ±.25 pF			TRANSISTOR: (SEE NOTE 1)
21-82204B33	5 ±0.5 pF			NPN; type M9494
	NOT USED	Q10	48-869494	NPN; type M9932
21-82610C20	82; 200 V	Q11	48-869658	NPN; type M9658
21-83596E10	220 ±20%	Q12, 13	48-869494	NPN; type M9494
	NOT USED	Q14	48-869632	NPN; type M9932
21-82877B24	220 ±10%; 75 V	Q15 thru 17	48-869642	NPN; type M9642
21-84494B39	19 ±3%	Q18	48-869571	NOT USED
21-83406D55	18	Q19	48-869571	NPN; type M9571
21-82428B04	.01 uF -30+70%; 100 V	Q20	48-869642	NPN; type M9642
23-84538G06	47 uF ±20%; 20 V	Q21	48-869642	NPN; type M9642
21-82877B34	150 ±10%; 50 V	Q22	48-869642	NPN; type M9642
21-83406D77	30	Q23	48-869642	NPN; type M9642
23-84665F06	220 uF -0+150%; 25 V	Q24	48-869642	NPN; type M9642
23-84665F03	220 uF -0+100%; 25 V	Q25	48-869642	NPN; type M9642
21-83596E10	220 ±20%	Q26	48-869642	NPN; type M9642
21-83596E10	220 ±20%	Q27	48-869642	NPN; type M9642
23-84665F01	10 uF -0+100%; 25 V	Q28	48-869642	NPN; type M9642
	NOT USED	Q29	48-869642	NPN; type M9642
21-83596E10	220 ±20%	Q30	48-869642	NPN; type M9642
21-82372C10	.05 uF ±20%; 25 V	Q31	48-869642	NPN; type M9642
		Q32	48-869642	NPN; type M9642
48-83510F03	DIODE: (SEE NOTE 1)	Q33	48-869642	NPN; type M9642
48-83510F03	silicon	Q34	48-869642	NPN; type M9642
48-82139G01	silicon (2-freq.)	Q35	48-869642	NPN; type M9642
	germanium	Q36	48-869642	NPN; type M9642
48-83654H01	NOT USED	Q37	48-869642	NPN; type M9642
48-83654H01	silicon	Q38	48-869642	NPN; type M9642
48-82190H13	silicon	Q39	48-869642	NPN; type M9642
48-82190H13	silicon (2-freq.)	Q40	48-869642	NPN; type M9642
	NOT USED	Q41	48-869642	NPN; type M9642
48-83654H01	silicon (2-freq.)	Q42	48-869642	NPN; type M9642
48-83654H01	silicon	Q43	48-869642	NPN; type M9642
48-82139G01	silicon	Q44	48-869642	NPN; type M9642
48-82525G13	silicon	Q45	48-869642	NPN; type M9642
48-83654H01	silicon	Q46	48-869642	NPN; type M9642
48-82466H13	silicon	Q47	48-869642	NPN; type M9642
	CONNECTOR, plug:	Q48	48-869642	NPN; type M9642
	includes:	Q49	48-869642	NPN; type M9642
15-83957L01	HOUSING, connector; 17-contact	Q50	48-869642	NPN; type M9642
29-82336A01	CONTACT, female; .865" long;	Q51	48-869642	NPN; type M9642
	2 used	Q52	48-869642	NPN; type M9642
29-84706E06	CONTACT, female; .660" long;	Q53	48-869642	NPN; type M9642
	10 used	Q54	48-869642	NPN; type M9642
	COIL, rf:	Q55	48-869642	NPN; type M9642
	NOT USED	Q56	48-869642	NPN; type M9642
24-82835G20	9.3 uH	Q57	48-869642	NPN; type M9642
24-82835G20	9.3 uH (2-freq.)	Q58	48-869642	NPN; type M9642
24-83601K01	18-1/2 turns (2-freq.)	Q59	48-869642	NPN; type M9642
24-83601K01	18-1/2 turns	Q60	48-869642	NPN; type M9642
24-82723H03	23 uH	Q61	48-869642	NPN; type M9642
24-84972A01	2-1/2 turns; coded yellow	Q62	48-869642	NPN; type M9642
	NOT USED	Q63	48-869642	NPN; type M9642
24-82723H01	1.2 uH	Q64	48-869642	NPN; type M9642
24-84419D08	33-1/2 turns; coded grn	Q65	48-869642	NPN; type M9642
	NOT USED	Q66	48-869642	NPN; type M9642
24-84419D03	33-1/2 turns; coded green	Q67	48-869642	NPN; type M9642
24-82835G20	5.6 uH	Q68	48-869642	NPN; type M9642
24-84419D04	23-1/2 turns; coded blue	Q69	48-869642	NPN; type M9642
	(attached to C49)	Q70	48-869642	NPN; type M9642
24-82835G20	9.3 uH	Q71	48-869642	NPN; type M9642
	NOT USED	Q72	48-869642	NPN; type M9642
24-82549D25	10 uH	Q73	48-869642	NPN; type M9642
24-82835G04	1.5 uH	Q74	48-869642	NPN; type M9642
24-82922C09	22-1/2 turns	Q75	48-869642	NPN; type M9642
24-83601K01	18-1/2 turns	Q76	48-869642	NPN; type M9642
24-84922C09	22-1/2 turns (2-freq.)	Q77	48-869642	NPN; type M9642
24-83601K01	18-1/2 turns	Q78	48-869642	NPN; type M9642
24-84972A06	8-1/2 turns; coded orange	Q79	48-869642	NPN; type M9642
24-84972A04	8-1/2 turns; coded white	Q80	48-869642	NPN; type M9642
24-84972A05	8-1/2 turns; coded red	Q81	48-869642	NPN; type M9642
24-84972A06	3-1/2 turns; coded blue	Q82	48-869642	NPN; type M9642
24-82835G13	0.82 uH	Q83	48-869642	NPN; type M9642
24-82135G08	620 uH	Q84	48-869642	NPN; type M9642
24-84972A11	3-1/2 turns; coded black	Q85	48-869642	NPN; type M9642
24-83884G08	5-1/2 turns; coded orange	Q86	48-869642	NPN; type M9642
24-83857G09	5-1/2 turns; coded green	Q87	48-869642	NPN; type M9642
24-83961B01	3 turns; coded brown	Q88	48-869642	NPN; type M9642

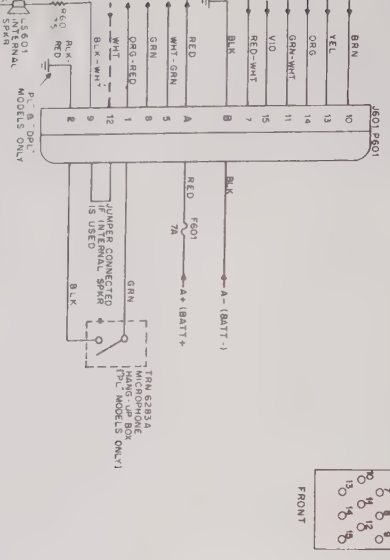
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R69	6-125A25	100 ±5%; 1/2 W (2-freq.)
R70 thru 79	6-124C97	NOT USED
R80	6-124A81	100k
R81	6-124A81	22k ±5%
R83	6-124C33	220k
R84	6-124C93	68k
R85	6-124D10	330k
R86	6-124A67	5.6k ±5%
R87	6-124A22	75 ±5%
R88	6-124A89	1k ±5%
R89, 90	6-124C63	47k
R91	6-124C61	3.9k
R92	6-124A92	3.3k
R93	6-124A97	62k ±5%
R94	6-124C59	100k ±5%
R95	6-124A79	2.7k
R96	6-124B04	18k ±5%
R97	6-124C25	180k ±5%
R98 thru 109	6-124C43	100
R110	6-124C43	NOT USED
R111 thru 119	6-124A69	560
R120	6-124A69	6.8k ±5%
R121	6-124A73	NOT USED
R122	6-124A73	10k ±5%
R123	6-124A71	NOT USED
R124	6-124C59	8.2k ±5%
R125	18-84944C02	variable; 25k ±20%; 0.1 W
R126	6-124C67	5.6k
R127	6-124B02	150k ±5%
R128	6-124B02	180k ±5%
R129	6-124B04	NOT USED
R130 thru 134	6-125A25	100 ±5%; 1/2 W
R135	18-84944C02	variable; 25k ±20%; 0.1 W
R136	6-124C67	5.6k (2-freq.)
R137	6-124B02	150k ±5%; (2-freq.)
R138	6-124B02	180k ±5%; (2-freq.)
R139	6-124A25	100 ±5%; 1/2 W (2-freq.)
R140	6-124A65	4.7k ±5% (2-freq.)
R141	6-124C75	12k (2-freq.)
R142	6-124A49	1k ±5% (2-freq.)
R143	6-124A65	4.7k ±5%
R144	6-124C75	12k
R145	6-124A49	1k ±5%
R146	6-124A73	10k ±5%
R147	6-124A67	5.6k ±5%
R148	6-124A83	27k ±5%
R149	6-124A19	56 ±5%
R150	6-124C33	220
R151	6-124A29	150 ±5%
R152	6-124C27	120
R153	6-124A33	220 ±5%
R154	6-124B61	4.7 ±5%
R155	6-124A17	47 ±5%
R156	6-124A63	NOT USED
R157	6-124C51	1.2k
R158	17-82036G24	.13 ±5%; 2 W
R159	6-125C23	82; 1/2 W
R160	18-84944C01	variable; 2k ±20%; 0.1 W
R161	6-124A7	18
R162	6-124A49	1k ±5%
R163	6-124A49	1.5k
R164	6-124A49	1.2k
R165	6-124A49	1.2k
R166	6-124A49	1.2k
R167	6-124A49	1.2k
R168	6-124A49	1.2k
R169	6-124A49	1.2k
R170	6-124A49	1.2k
R171	6-124A49	1.2k
R172	6-124A49	1.2k
R173	6-124A49	1.2k
R174	6-124A49	1.2k
R175	6-124A49	1.2k
R176	6-124A49	1.2k
R177	6-124A49	1.2k
R178	6-124A49	1.2k
R179	6-124A49	1.2k
R180	6-124A49	1.2k
R181	6-124A49	1.2k
R182	6-124A49	1.2k
R183	6-124A49	1.2k
R184	6-124A49	1.2k
R185	6-124A49	1.2k
R186	6-124A49	1.2k
R187	6-124A49	1.2k
R188	6-124A49	1.2k
R189	6-124A49	1.2k
R190	6-124A49	1.2k
R191	6-124A49	1.2k
R192	6-124A49	1.2k
R193	6-124A49	1.2k
R194	6-124A49	1.2k
R195	6-124A49	1.2k
R196	6-124A49	1.2k
R197	6-124A49	1.2k
R198	6-124A49	1.2k
R199	6-124A49	1.2k
R200	6-124A49	1.2k
R201	6-124A49	1.2k
R202	6-124A49	1.2k
R203	6-124A49	1.2k
R204	6-124A49	1.2k
R205	6-124A49	1.2k
R206	6-124A49	1.2k
R207	6-124A49	1.2k
R208	6-124A49	1.2k
R209	6-124A49	1.2k
R210	6-124A49	1.2k
R211	6-124A49	1.2k
R212	6-124A49	1.2k
R213	6-124A49	1.2k
R214	6-124A49	1.2k
R215	6-124A49	1.2k
R216	6-124A49	1.2k
R217	6-124A49	1.2k
R218	6-124A49	1.2k
R219	6-124A49	1.2k
R220	6-124A49	1.2k
R221	6-124A49	1.2k
R222	6-124A49	1.2k
R223	6-124A49	1.2k
R224	6-124A49	1.2k
R225	6-124A49	1.2k
R226	6-124A49	1.2k
R227	6-124A49	1.2k
R228	6-124A49	1.2k
R229	6-124A49	1.2k
R230	6-124A49	1.2k
R231	6-124A49	1.2k
R232	6-124A49	1.2k
R233	6-124A49	1.2k
R234	6-124A49	1.2k
R235	6-124A49	1.2k
R236	6-124A49	1.2k
R237	6-124A49	1.2k
R238	6-124A49	1.2k
R239	6-124A49	1.2k
R240	6-124A49	1.2k
R241	6-124A49	1.2k
R242	6-124A49	1.2k
R243	6-124A49	1.2k
R244	6-124A49	1.2k
R245	6-124A49	1.2k
R246	6-124A49	1.2k
R247	6-124A49	1.2k
R248	6-124A49	1.2k
R249	6-124A49	1.2k
R250	6-124A49	1.2k
R251	6-124A49	1.2k
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R253	6-124A49	1.2k
R254	6-124A49	1.2k
R255	6-124A49	1.2k
R256	6-124A49	1.2k
R257	6-124A49	1.2k
R258	6-124A49	1.2k
R259	6-124A49	1.2k
R260	6-124A49	1.2k
R261	6-124A49	1.2k
R262	6-124A49	1.2k
R263	6-124A49	1.2k
R264	6-124A49	1.2k
R265	6-124A49	1.2k
R266	6-124A49	1.2k
R267	6-124A49	1.2k
R268	6-124A49	1.2k

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
U10	51-84320A78	INTEGRATED CIRCUIT: (SEE NOTE 1)
U11	51-84320A77	type M2078
VR2	48-82256C50	type M2077
VR313	48-82256C56	DIODE: (SEE NOTE 1)
VR802	48-82256C56	Zener; 13 V
		Zener; 8.8 V
		Zener; 8.8 V
Y10L		CRYSTAL UNIT: (SEE NOTE 1)
Y11L		KXN6121AG
Y10M, H		KXN6121AG
Y11M, H		KXN6122AA (2-freq.)
Y20	48-84396K05	10.7 MHz
Y21	48-84574K03	10.7 MHz
Y22	48-84396K02	10.7 MHz
Y23	48-84574K01	10.7 MHz
Y100L	KXN6121AH	
Y100M, H	KXN6121AA	
Y160L	KXN6121AH	
Y160M, H	KXN6121AA (2-freq.)	
Z1	51-84333G80	audio ampl./IDC limiter
Z2	51-84333G83	HYBRID CIRCUIT:

MEASURE/MENT POINT	DC VOLTAGE READINGS 100V DC CARRIER AT AMT.	NO CARRIER
002 BASE	0V	5V
002 COLLECTOR	1V	1V
002 EMITTER	0V	6V
003 BASE	0V	2V
003 COLLECTOR	5V	1.3V
003 EMITTER	3.4V	1.3V
004 BASE	8.1V	3.4V
004 COLLECTOR	3.4V	6.8V
006 EMITTER	3.4V	1.3V

2-POLE
CRYSTAL

SUPPLIES REGULATED +8.0 V TO XMR1
& MCVR OSCILLATORS, SOURCE
CIRCUIT & AUDIO PREAMPLIFIER.
Q310 PROVIDES CURRENT REGULATION.
V313 PROVIDES VOLTAGE REGULATION.



RECEIVER SECTION



FUNCTION

Amplifies, mixes, filters, and demodulates received rf energy from antenna (via antenna switch) and provides an amplified audio signal to the speaker.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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TRN8202A Hardware Kit, Main Board PL-5884-O

C629 thru 633	21-82812H04	<u>CAPACITOR, fixed:</u> 1000 pF
DS310, 311	65-83376K01	<u>LAMP:</u> 14 V
Q116 Q122 Q803	48-869640 48-869859 48-869647	<u>TRANSISTORS: (SEE NOTE)</u> NPN; type M9640 NPN; type M9859 PNP; type M9647
R46 R56	18-83287K01 18-83288K01	<u>RESISTORS, variable:</u> 100k $\pm$ 30%; 1/4 W 100k $\pm$ 30%; 1/4 W (includes S601)

NON-REFERENCED ITEMS

1-80707D13	TRANSISTOR & HEAT SINK ASSEMBLY includes: ref. item Q122
14-861196 26-84411K01 1-80707D38	INSULATOR, transistor HEAT SINK FEEDTHRU ASSEMBLY, power amplifier includes: ref. items C629 thru C633
7-83134K01 27-82018M01 15-82060M01 1-80708D07	BRACKET, mounting CHASSIS HOUSING RECEPTACLE, microphone, assembly includes:
9-84981L01 2-10054A74 3-134185	CONNECTOR, microphone NUT, spring; 6-32 SCREW, tapping; 6-32 x 1/4" 2 used
3-134186	SCREW, tapping; 6-32 x 5/16" 4 used
3-135506	SCREW, tapping; 6-32 x 1/4" 2 used
3-136782	SCREW, machine; 2-56 x 3/16" 2 used
3-136935 3-138028	SCREW, machine; 2-56 x 1/4" 2 used SCREW, machine; 2-56 x 5/32" 2 used
14-83572K01 14-84268A01 14-84849K01 15-84403K01 15-84959L01 22-10133A19 26-83294K01 26-83336L01 26-84170L01 26-84604K03 26-84848K01 42-10217A02 42-82999L02 76-84069B02	INSULATOR, transistor INSULATOR, transistor INSULATOR, capacitor COVER, coaxial COVER, mixer PIN; .250" x .125"; 2 used SHIELD SHIELD, receiver SHIELD, oscillator SHIELD, power amplifier SHIELD, exciter STRAP, cable harness CLIP CORE, ferrite bead; 2 used

TRN8499A Preselector Board PL-5886-O

C212, 213 C214	21-84713A16 21-82989E20	<u>CAPACITOR, fixed:</u> 12 pF $\pm$ 5%; 50 V 8.5 pF $\pm$ 0.25 pF; 500 V
L214	24-83542L09	<u>COIL, rf:</u> 4-1/8 turns

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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LEGEND

L = 136-150.8 MHz
M = 150.8-162 MHz
H = 162-174 MHz

TLD5591A RF Deck (136-150.8 MHz)

TLD5592A RF Deck (150.8-162 MHz)

TLD5593A RF Deck (162-174 MHz) PL-5883-O

C207	21-84760C01	<u>CAPACITOR, fixed:</u> 470 pF (feedthru)
L205L, 209L L205M, 209M L205H, 209H L206L, 207L, 208L L206M, 207M, 208M L206H, 207H, 208H L210L L210M L210H L211L L211M L211H L212L L212M L212H	24-84672L10 24-84672L12 24-84672L14 24-84672L11 24-84672L13 24-84672L15 24-84672L16 24-84672L19 24-84672L22 24-84672L17 24-84672L20 24-84672L23 24-84672L18 24-84672L21 24-84672L24	<u>COILS, rf:</u> 26-1/2 turns; coded brn-blk 24-3/4 turns; coded brn-red 24-3/4 turns; coded blk-yel 27 turns; coded brn-brn 27 turns; coded brn-orn 27 turns; coded blk-grn 28-1/2 turns; coded brn-blu 26 turns; coded brn-wht 26 turns; coded red-red 28 turns; coded brn-vio 26 turns; coded red-blk 26 turns; coded red-orn 28-1/2 turns; coded brn-gry 26 turns; coded red-brn 26 turns; coded red-yel

NON-REFERENCED ITEMS

1-80707D49 15-84945L01 29-82154M01 14-84886A01	HOUSING ASSEMBLY includes: ref. item C207 HOUSING TERMINAL, stake-on INSULATOR, stand off
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TRN6831A RF Deck Hardware Kit PL-5889-O

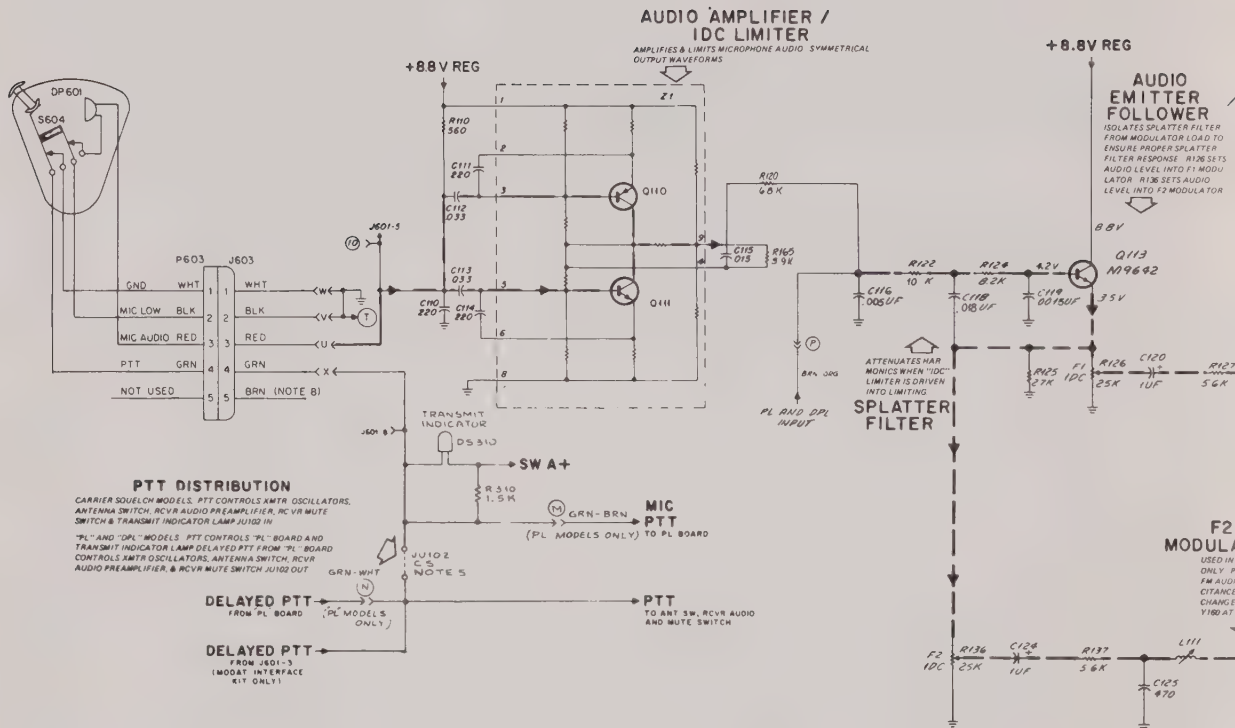
1-80707D50 15-84960L01 42-82034M01 3-84589G02 15-84958L01 3-138028 3-136935	COVER ASSEMBLY includes: COVER, rf deck RETAINER, tuning slug SCREW, set; 8-36 x 7/16"; 11 used COVER, preamplifier SCREW, machine 2-56 x 5/32"; 4 used SCREW, machine 2-56 x 1/4"; 14 used
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TLD5611A Mixer Board (130-150.8 MHz)

TLD5612A Mixer Board (150.8-162 MHz)

TLD5613A Mixer Board (162-174 MHz) PL-5888-O

C208L C208M C208H C209 C210 C211	21-82240K03 21-84511B73 21-84511B88 21-82358G12 21-82877B17 21-82213E21	<u>CAPACITORS, fixed: pF:</u> 13 $\pm$ 5%; 50 V 10 $\pm$.25 pF; 50 V 6.8 $\pm$.25 pF; 50 V 100 $\pm$ 5%; 100 V 5 $\pm$ 5%; 75 V .002 uF -0+100%; 75 V
L213	24-84783E04	<u>COIL, rf:</u> 3-1/2 turns
Q211	48-869839	<u>TRANSISTOR: (SEE NOTE)</u> FET; type M9839
R205 R206 R207	6-185A35 6-185B64 6-185A73	<u>RESISTOR, fixed: $\pm$5%; 1/8 W:</u> 270 56 10k



Mod - 9 WHERE MOD - XTAL FREQ IS CARRIEN FREQ.
L110 SETS Y100 FREQ 0118 NORMALLY INACTIVE, ACTI-
VATED BY F1 PTT GROUND VIA FREQ SELECT SWITCH
S803A (OR J101 IN SINGLE FREQ MODELS)



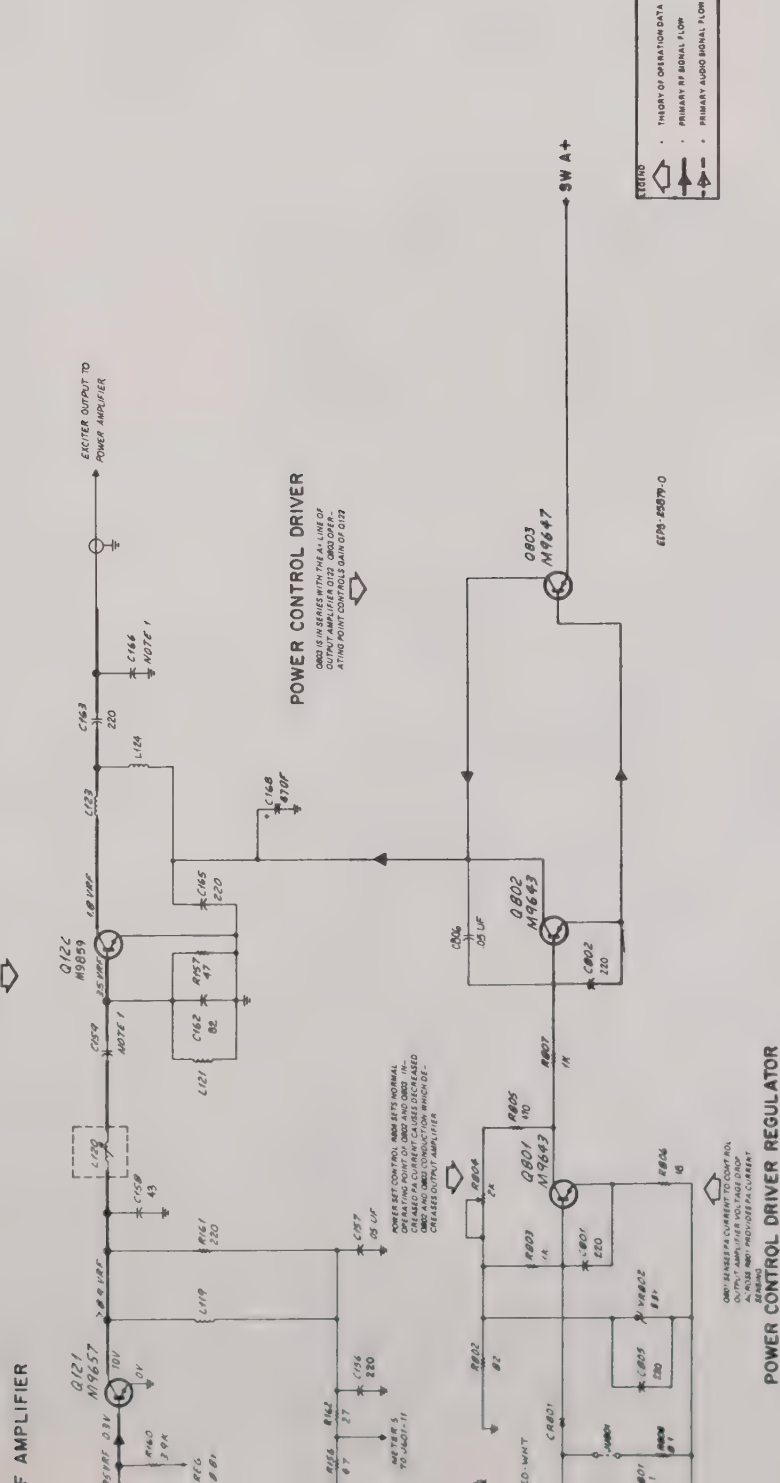
- NOTE:
1. REFER TO PARTS LIST FOR COMPONENT VALUES
2. TAKE OFF THE WIRE BOTTLE, CAPSULE VALVE AND IN OHMS AND CAPACITOR VALUES ARE IN MICRO FARADS
3. VOLTAGE NOT AFFECTED BY AIR FLOW
4. T
5. T - TRANSMITTER AND R - RECEIVER
6. U - RECEIVER UNBOOTHED
7. R - RECEIVER FULLY ASSEMBLED
8. USES OF THE WIRE BOTTLE TO HOLD VALVE ARE EXHAUSTED BY AIR OR VACUUM
9. VALVE ORIENTED TO VENTILATE AIR AND VOLTAGE ARE MEASURED WITH AIR AT 100 CM/HRS
10. VARIATION ABOUT 10% IN AIR FLOW RATE IS COMPENSATION FOR
11. USES OF THE WIRE BOTTLE WITH VOLTAGE CONTROL, FULLY COATED
12. PHYSICALLY, THE WIRE BOTTLE
13. MAKING AN OBSERVATION OF THE WIRE BOTTLE, A GOOD CONNECTION
14. AND A LITTLE RESISTANCE IN THE WIRE BOTTLE, A GOOD CONNECTION
15. FOR CAPACITORS, CAPACITORS CAN BE CONNECTED TO BATTERY (V₁) FOR
16. FOR CAPACITORS, CAPACITORS CAN BE CONNECTED TO BATTERY (V₁) FOR

SW A + - RED

UNIFIED CHASSIS EXCITER SECTION

FUNCTION

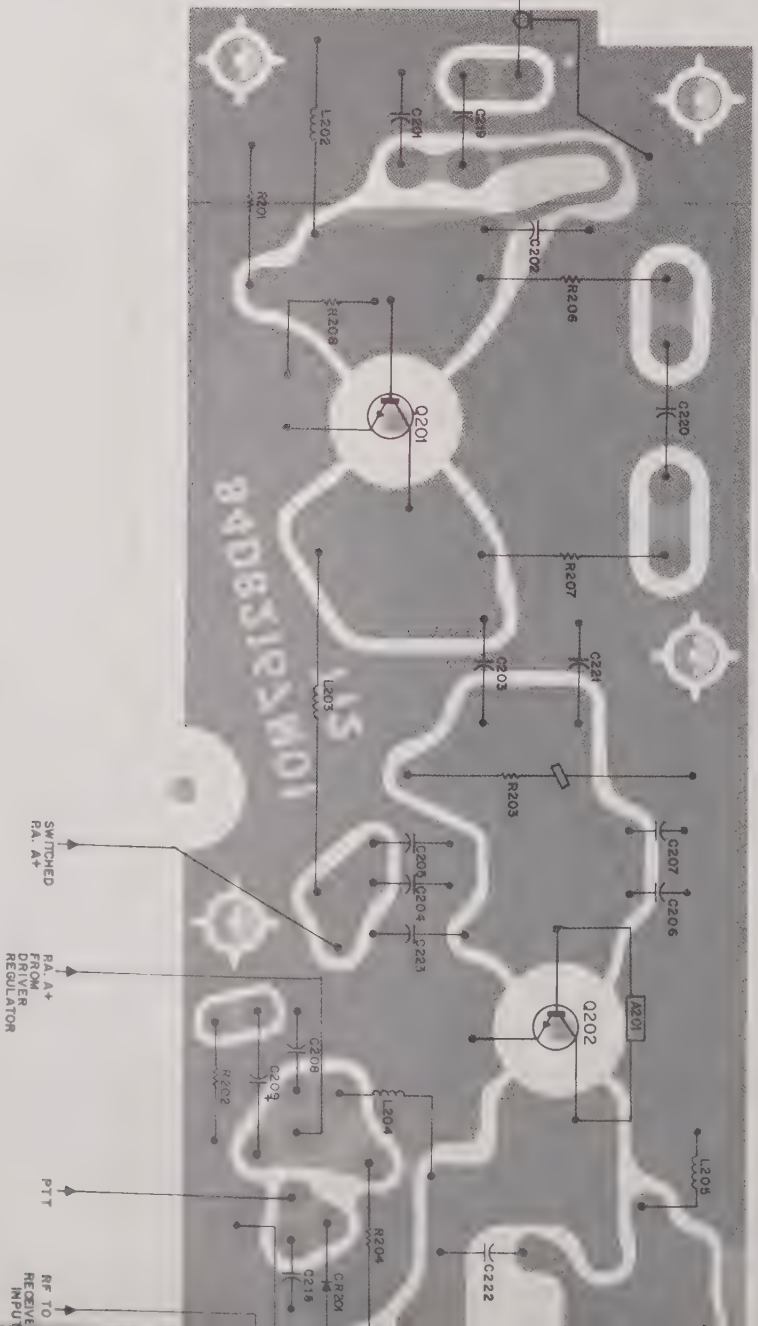
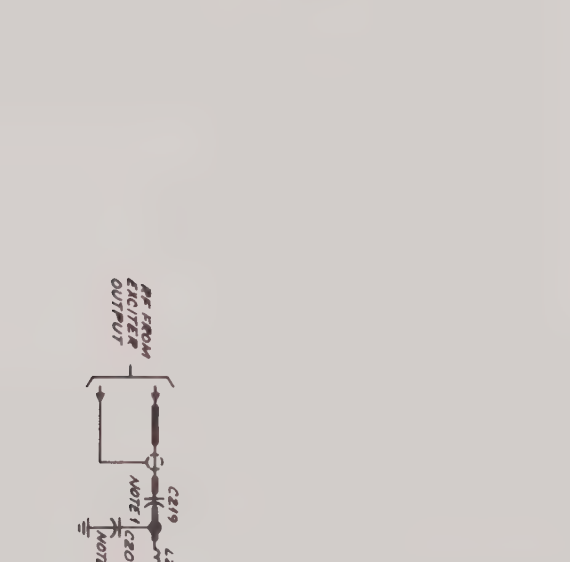
Amplifies voice signals from the microphone and produces a low-level frequency modulated rf signal for the rf power amplifier.



ANTENN
SACVM INPUT
10. 0215 - 1/4
UT END
PTT UNGRAC

CIRCUIT IS H
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IT. PTT (DEL
DUCTS (SMA
PUT CAUSES

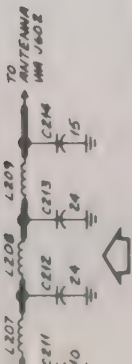
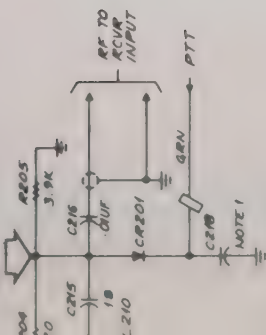
4206



4A SWITCH

DURING TRANSMISSION, NETWORK
WAVE TRANSMISSION LINE. CR201
INPUT.

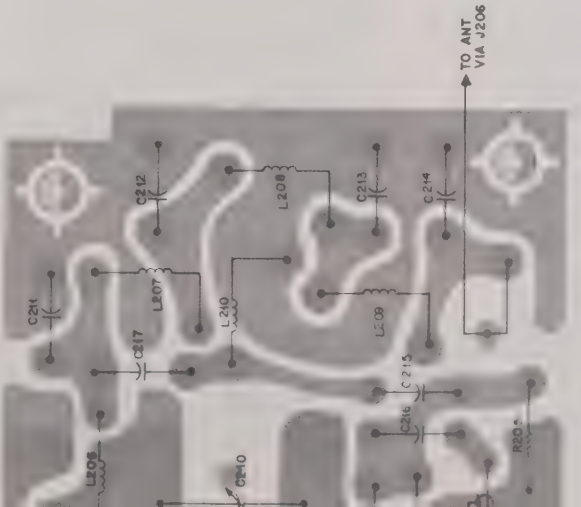
UNDEP. CR201 NON-CONDUCTING
AVE LINE INPUT Z = 50 OHMS. PA
HIGH IMPEDANCE TO RECEIVED RF.



CEPS-26007

HARMONIC FILTER

ENUNATES FREQUENCIES ABOVE 160.8 MHz
(RANGE) 162 MHz (MEDIUM RANGE) OR
163 MHz (HIGH RANGE)



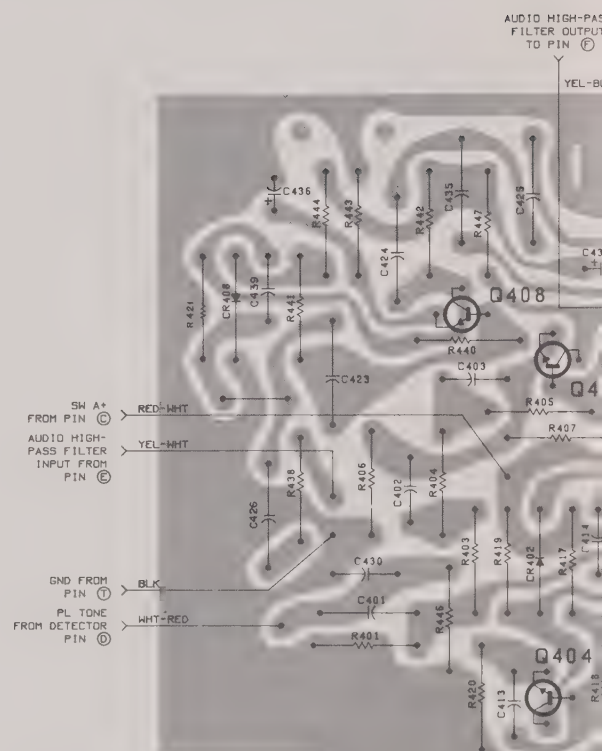
COMPONENT SIDE BD-DEPS-26008-0
SOLDER SIDE BD-DEPS-2600

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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PARTS LIST

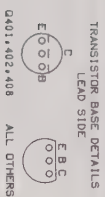
TRN6177B "Private-Line" Encoder/Decoder PL-3340-Q

		CAPACITOR, fixed: μF $\pm 10\%$; 100 V; unless otherwise stated
C401, 412, 427	21-82372C01	0.1 $\pm 80\text{-}20\%$; 25 V
C402, 403, 405, 430	21-82428B59	.01 $\pm 80\text{-}20\%$; 200 V
C404	21-82428B23	.0012
C406, 411, 413, 414, 420, 422, 433, 437	21-83596E10	220 pF $\pm 20\%$; 500 V
C407, 408, 410, 416, 421, 428, 436	23-84665F01	10 $\pm 100\text{-}0\%$; 25 V
C409, 418, 419	21-82428B09	.0047
C415	8-82096J20	0.22; 250 V
C417, 429, 431	23-84665F04	1 $\pm 150\text{-}0\%$; 50 V
C423, 424, 426, 435	8-84496D04	.047 $\pm 20\%$; 100 V
C425	8-82905G31	0.15; 50 V
C434	8-83813H01	.0068
C438	8-82096J20	0.22; 250 V
C439	21-82428B28	.002
C440	23-84665F04	1.0 $\pm 150\text{-}0\%$; 50 V
CR401		NOT USED
CR402, 405, 407, 408, 409	48-83654H01	silicon
CR404	48-82178A06	germanium
L401	25-82498H02	COIL: 6 H
Q401, 402, 408	48-134667	TRANSISTOR: (SEE NOTE) NPN; type M54
Q403 thru 406, 409	48-869642	NPN; type M9642
Q407	48-869643	PNP; type M9643
R401, 402, 406, 440	6-124D02	RESISTOR, fixed: $\pm 10\%$; 1/4 W; unless otherwise stated 150k
R403, 404, 405, 407, 411, 417	6-124A99	120k $\pm 5\%$
R408, 428, 447	6-124C49	1k
R409	6-124C69	6.8k
R410	6-124C63	3.9k
R412, 418, 446	6-124C85	33k
R413, 419	6-124C55	1.8k
R414, 420	6-124C37	330
R415	6-124C93	68k
R416	6-124C65	4.7k
R421, 435	6-124C87	22k
R424	6-124C67	5.6k
R425	6-124A73	10k $\pm 5\%$ (TRN6177C)
R426, 438, 443, 444	6-124C832	27k (TRN6177B)
R427	6-124C79	18k
R429	6-124C83	27k
R430	6-124C33	220
R431	6-124C61	3.3k
R432	6-124C57	2.2k
R433	18-84944C02	variable; 25k
R434	6-124C53	1.5k
R436	6-124C45	680
R437, 442, 448	6-124C97	100k
R441	6-124C89	47k
R445	6-124C77	15k
R449	6-124C73	10k
R450	6-124A61	3.3k $\pm 5\%$
RT401	6-82990E18	THERMISTOR: 190 ohms
U401	51-84267A04	INTEGRATED CIRCUIT: (SEE NOTE) type 67A04
VR401	48-82256C25	DIODE: (SEE NOTE) Zener type; 12 V
NON-REFERENCED ITEMS		
	KLN6209A	"VIBRASPONDER", resonant reed
	42-84116B02	SOCKET, "Vibrasponder"
	39-10184A10	CONTACT, push-pin; male
	39-10184A24	CONTACT, push-pin; female; 9 req'd.
	29-84706E06	PIN, female; molex



SHOWN FROM SOLDER SIDE

NOTE: For optimum performance, replacement diodes, transistors, and integrated circuits must be ordered by Motorola part number.

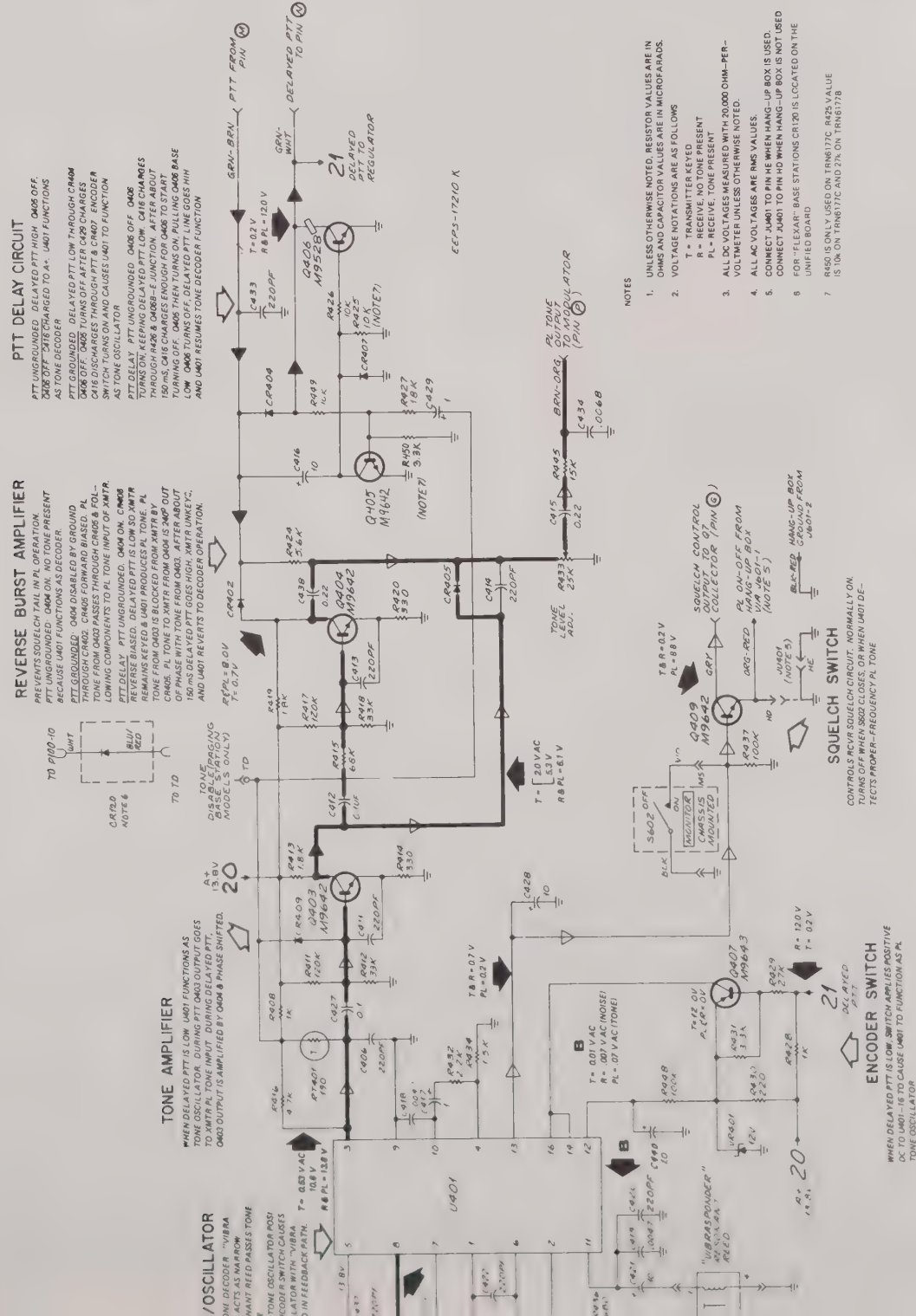


TONE “PRIVATE-LINE” ENCODER/DECODER

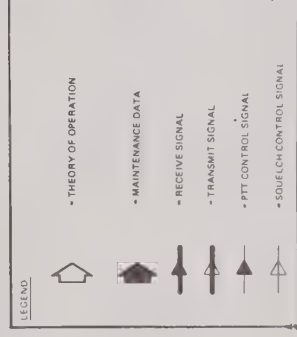
MODEL TRN6177C

FUNCTION

Encodes and decodes sub-audible "Private-Line" tones. Encoder modulates transmitter and delays transmitter turn-off 150 mS to allow transmission of turn-off reverse tone burst. Decoder detects received tone and unspools receiver when proper tone is received.



- NOTES
1. UNLESS OTHERWISE NOTED, RESISTOR VALUES ARE IN OHMS, AND CAPACITOR VALUES ARE IN MICROFARADS.
 2. VOLTAGE NOTATIONS ARE AS FOLLOWS:
T = TRANSMITTER KEY/PUSH
R = RECEIVER
PL = RECEIVE, TONE PRESENT
ALL DC VOLTAGES MEASURED WITH 20,000 OHM-PER-VOLT VOLTMETER UNLESS OTHERWISE NOTED.
 3. ALL DC VOLTAGES ARE RMS VALUES.
 4. ALL AC VOLTAGES ARE RMS VALUES.
 5. CONNECT J4001 TO PIN 6 WHEN HANG-UP BOX IS USED.
CONNECT J4001 TO PIN 10 WHEN HANG-UP BOX IS USED.
 6. "FLEXAR" BASE STATION CR120 IS LOCATED ON UNIFIED BOARD
 7. R404 IS ONLY USED ON TERN-370. R404 VALUE IS 5.0K ON TERN370 AND 2.2K ON TERN1728

68P81029E99-H
5/1/78-VG

DESK MICROPHONES

MODELS TMN1008A, TMN1011A,
TMN1018A, TMN1021A, TMN1022A

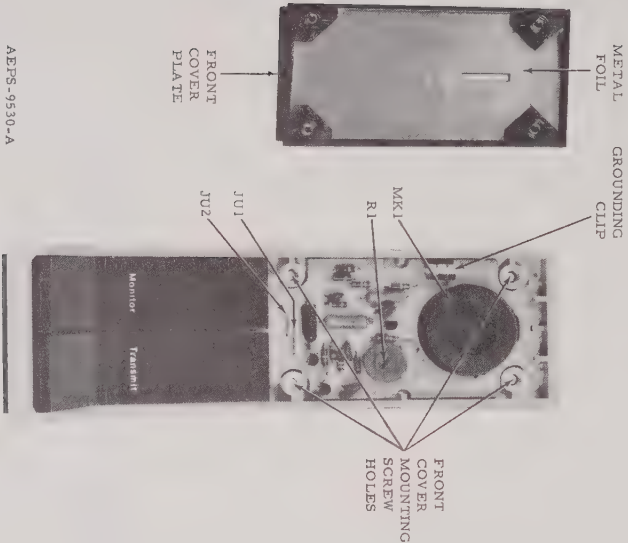
PARTS LIST

TRN6029A & TJN4925A Microphone Circuit Board PL-3510-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1	21-82187B08	CAPACITOR, fixed: $\mu F \pm 10\%$
C2	8-82987E11	.022; 80 V
C3	21-82187B44	.001; 100 V
C4	23-84762H09	15; $\pm 20\%$; 20 V
C5	21-82187B44	.001; 100 V
C6	8-82987E02	.047; 200 V
C7	21-82187B45	470 pF; 500 V
MK1	59-846+0E01	CARTRIDGE, microphone: miniature
Q1	48-869571	TRANSISTOR: (SEE NOTE)
Q2, 3	48-869594	PNP; type M9571 NPN; type M9594
R1	18-83083G34	RESISTOR, fixed: $\pm 10\%$; 1/4 W; unl. stated
R2	6-129226	variable; 1.5 meg $\pm 30\%$
R3	6-127805	100k
R4	6-124B14	15k
R5	6-129668	470k $\pm 5\%$
R7	6-129707	10k $\pm 5\%$
R8	6-131858	2.7k $\pm 5\%$
R9	6-129231	270k $\pm 5\%$
R11	6-129753	3.3k
NON-REFERENCED ITEMS		
	5-84371E01	GROMMET, cartridge
	42-84724E01	CLIP, grounding

FUNCTION

The desk microphones provide a desk surface self-supporting stand to mount the PTT and PL monitor switches and to support the dynamic cartoid microphone element at mouth level. The TMN1008A, TMN1010A and TMN1022A are used in "Private-Line" squelch systems and provide both PTT and monitor switches; the TMN1009A, TMN1011A and TMN1021A are used with carrier squelch systems and use only the PTT switch. The TMN1018A is used in paging applications and includes both PTT and monitor switches.



AEPS-9530-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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PARTS LIST

THN6254A (PL), & THN6255A (Carrier Squelch),
THN6320A (Paging)
Microphone Housing & Hardware Kit

PL-3573-B

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
S1, 2	40-84711E03	SWITCH, leaf: assembly: S1 has 1 form A, 1 form B and 1 form C; S2 has 1 form A and 1 form B (THN6254A and THN6320A) assembly: includes 1 form A and 1 form B (THN6255A)
S1	40-84711E02	
NON-REFERENCED ITEMS		
	3-136676	SCREW, switch mtg. 4-40 x 1/4 pul hex
	1-80779B59	CABLE ASSEMBLY includes: connector, 28-83372F02
	15-84186E01	COVER, front
	15-84188E01	COVER, rear
	15-84191E01	HOUSING
	26-84720E01	FOIL, grounding, front cover
	26-84721E01	FOIL, grounding, rear cover
	38-84184E02	BUTTON, left hand (THN6154A)
	38-84184E01	BUTTON, left hand (THN6155A)
	38-84192E01	BUTTON, right hand
	42-84725E01	CLIP, retainer
	47-84193E01	SHAFT
	47-84194E01	SHAFT EXTENSION
	47-84723E01	SHAFT COUPLING (THN6154A only)
	22-82591C05	PIN, roll (THN6154A only)
	64-84183E01	PLATE, base
	75-84722E01	PAD, base plate
	3-138809	BASE PLATE SCREW 4-40 x 5/16 phl bn hx bk ox
	3-138810	FRONT COVER SCREW 4-40 x 5/8 phl bn hx bk ox
	4-10058B10	WASHER ("TEFLON")

THN6252A (PL) & THN6253A (Carrier Squelch)
Microphone Housing & Hardware Kit

NOTE: Rep

part

S1, 2	40-84711E03	SWITCH, leaf: assembly: S1 has 1 form A, 1 form B and 1 form C; S2 has 1 form A and 1 form B (THN6252A)
S1	40-84711E02	assembly: includes 1 form A, 1 form B and 1 form C (THN6253A)

NON-REFERENCED ITEMS		
	3-136676	SCREW, switch mtg. 4-40 x 1/4 pul hex
	1-80780B29	CABLE ASSEMBLY includes: 39-10184A24 LUGS; 5 req'd.
	15-84186E01	COVER, front
	15-84188E01	COVER, rear
	15-84191E01	HOUSING
	26-84720E01	FOIL, grounding, front cover
	26-84721E01	FOIL, grounding, rear cover
	38-84184E02	BUTTON, plain (THN6253A)
	38-84184E01	BUTTON, "monitor" (THN6252A)
	38-84192E01	BUTTON, "transmit"
	42-84725E01	CLIP, shaft retainer
	47-84193E01	SHAFT, pivot
	47-84194E01	SHAFT EXTENSION
	47-84723E01	SHAFT COUPLING (THN6252A) only)
	22-82591C05	PIN, roll (THN6252A only)
	64-84183E01	PLATE, base
	75-84722E01	PAD, base plate
	3-138809	BASE PLATE SCREW 4-40 x 5/16 phl bn hx bk ox
	3-138810	FRONT COVER SCREW 4-40 x 5/8 phl bn hx bk ox
	4-10058B10	WASHER ("TEFLON")

parts list

THN6370A (PL) &
THN6370A (Paging)
Microphone Housing

REFERENCE SYMBOL

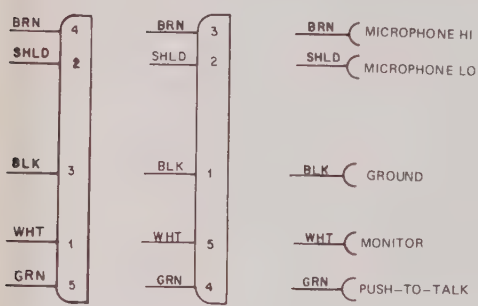
S1, 2

S1

CONNECTOR
DETAIL FOR
OLDER PAGING
CONTROL STATION
TMN1011A

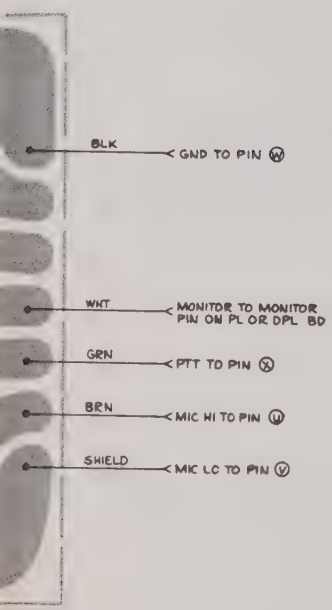
CONNECTOR
DETAIL FOR
BASE STATION
TMN1021A AND
TMN1022A

EXTERNAL CONNECTIONS
FOR NEW OR PAGING
CONTROL STATIONS



DEPS-17648-F

	VERSION
	2
	0
HARDWARE KIT	0
HARDWARE KIT	0
ARDWARE KIT	0
ARDWARE KIT	0
HARDWARE KIT	0
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HARDWARE KIT	0

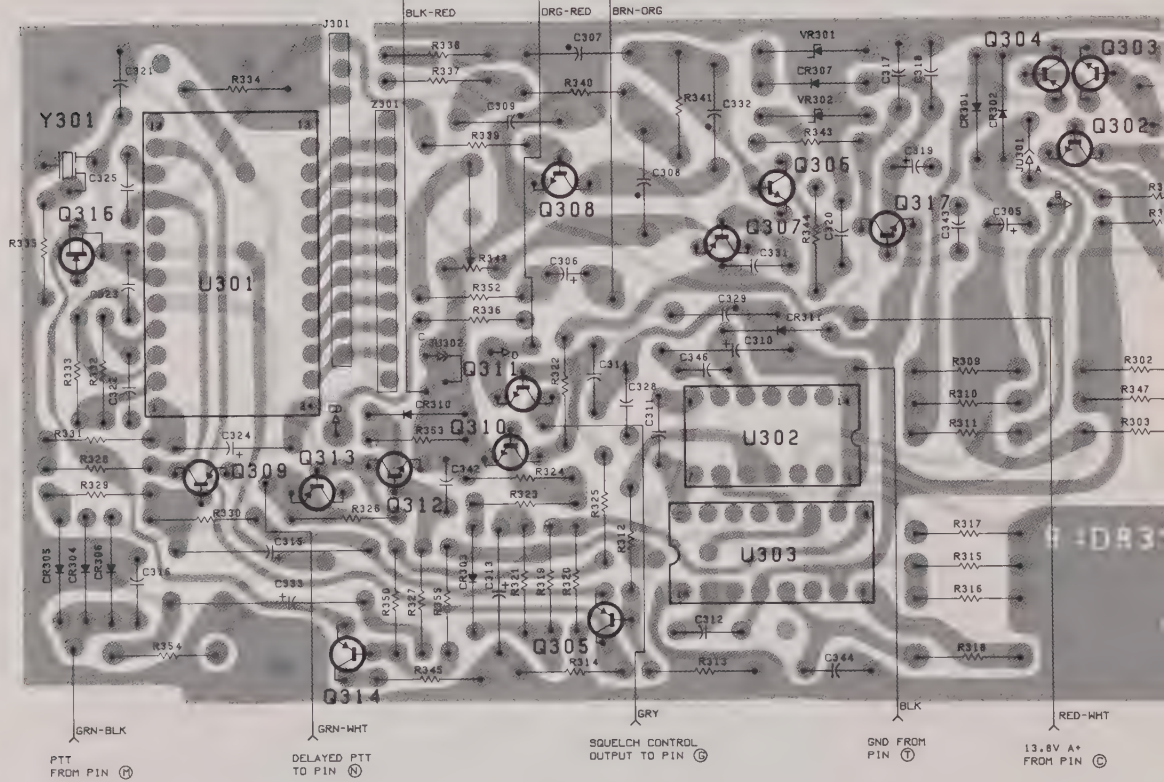


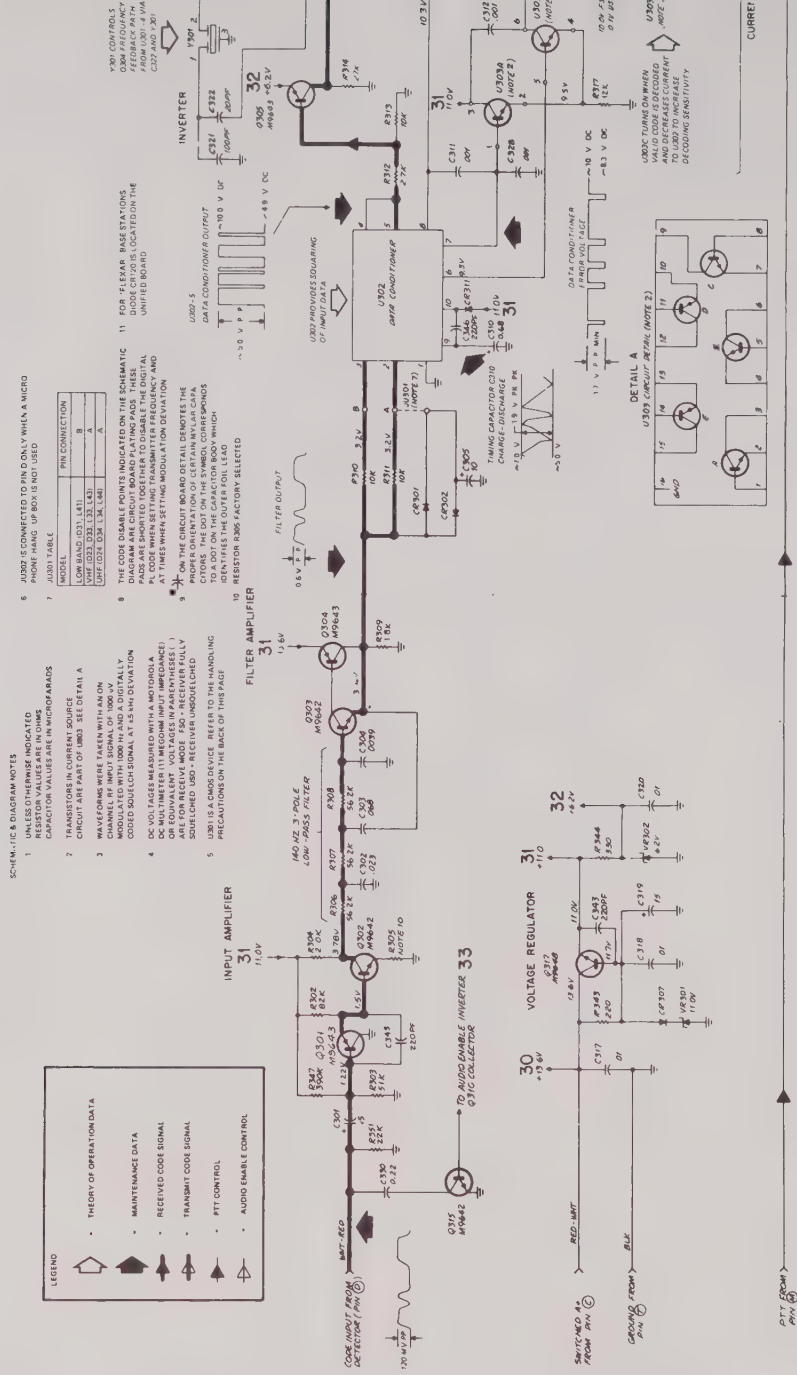
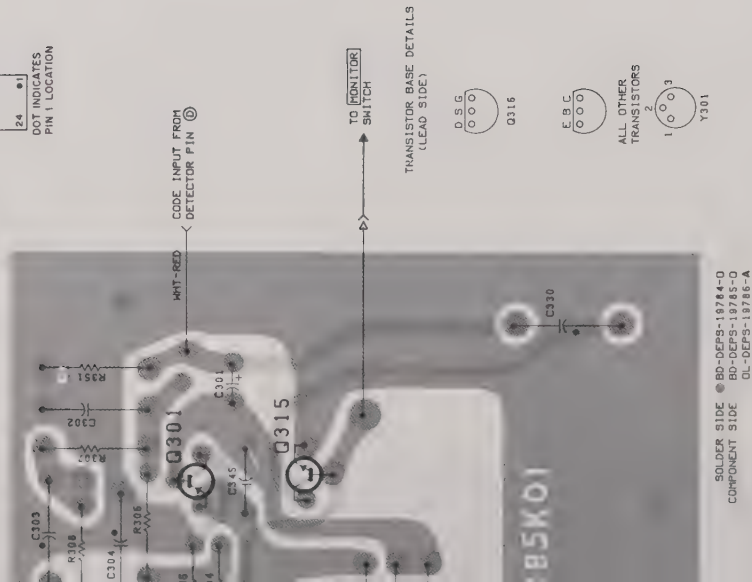
HANG-UP BOX
GND VIA J601-2

PL ON-OFF
FROM HANG-UP
BOX VIA J601-1

CODE OUTPUT
TO MODULATOR
PIN ⑥

SHOWN FROM SOLDER SIDE



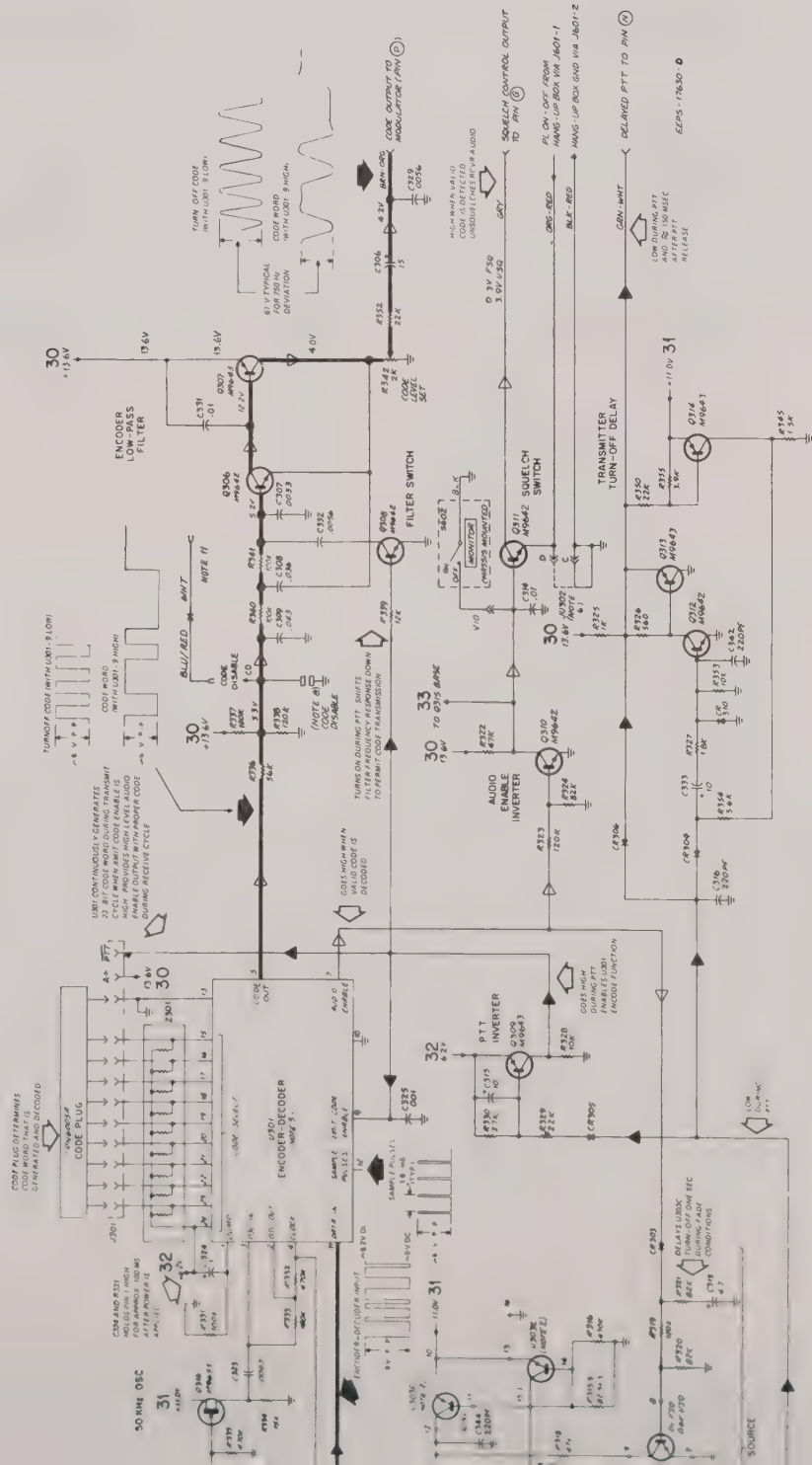


SOLDER SIDE ● BD-DEPS-19784-0
COMPONENT SIDE BD-DEPS-19785-0
OL-DEPS-19786-A

“DIGITAL PRIVATE-LINE” ENCODER/DECODER MODEL TRN6207A

FUNCTION

Encodes and decodes “Digital Private-Line” codes. Encoder modulates transmitter and delays transmitter turn-off 150 mS to allow transmission of turn-off code. Decoder detects received tone and unsquelches receiver when proper code is received.



PARTS LIST AND MAINTENANCE
INFORMATION IS SHOWN ON THE
BACK OF THIS DIAGRAM

68P81030E07-D
(Sheet 1 of 2)
5/1/78-VG

“DIGITAL PRIVATE-LINE” ENCODER/DECODER

PARTS LIST

TRN6207A "Digital Private-Line" Encoder-Decoder PL-3560-A

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
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Z301	51-82142K02	NETWORK: resistive
Y301	48-82003K01	CRYSTAL: (SEE NOTE II) resonator, 50,00000 kHz
VR301 VR302	48-82256C34 48-83696E07	VOLTAGE REGULATOR: Zener type: 11.0 V Zener type: 6.2 V

NOTES:

- I. Replacement transistors must be ordered by Motorola part number only for optimum performance.
- II. When ordering crystal units, specify carrier frequency, crystal frequency and crystal type number.

C301, 306, 319	23-84665E02	CAPACITOR, fixed; uF ±5%;
C302	8-82905C39	50 V; unless otherwise stated
C303	8-83813H23	15 +100-0%; 35 V
C304	8-83813H19	.023
C305	23-84665E01	.068
C307	8-83813H27	.0039
C308	8-83813H24	10 +100-0%; 35V
C309	8-83813H14	.0033
C310	23-82783B48	.036
C311, 312, 328	21-82187B20	.043
C313	23-84762H07	0-.68; 35 V
C314, 317, 318,	21-82428B59	.001 ±10%; 100 V
320, 331		4.7 ±20%; 10 V
C315	23-82783B27	.01 +80-20%; 200 V
C316, 344, 345	21-83596E10	10 ±10%; 25 V
C321	21-83798B01	220 pF ±10%; 500 V
C322	21-840849	100 pF; 200 V
C323	21-82428B09	20 pF; 500 V
C324	23-82783B08	.0047 ±10%; 100 V
C325	21-82187B20	1 ±20%; 35 V
C329, 332	8-83813H26	.001 ±10%; 100 V
C330	8-82905C32	.0056
C333	23D82783B27	0-.22 ±10%; 50 V
C342, 343, 346	21D82877B24	10 uF
CR301, 302		220 pF
CR303, 304, 305		DIODE: (SEE NOTE)
307, 310, 311	48-84616A01	Hot carrier
CR306	48-83654H01	silicon
J301	48C82178A06	germanium
Q301, 304, 305,		SOCKET:
307, 309, 313,	9-82071K01	female; 12 contact
314		TRANSISTOR: (SEE NOTE)
Q302, 303, 306,		PNP: type M9643
308, 310, 311,		NPN: type M9642
312, 315		
Q316	48-869653	field-effect; type M9653
Q317	48-869648	NPN; type M9648
R302	6-124A95	RESISTOR, fixed; ±5%; 1/4 W;
R303, 336	6-124A90	unless otherwise stated
R304, 327	6-124A56	82k
R305		51k
R306, 307, 308	6-13755D64	2-.0k
R309	6-124A55	(factory selected)
R310, 311,	6-124A73	56-.2k ±1%
R312	6-124C59	1-.8k
R313, 328, 353	6-124C73	10k
R314	6-124C83	2.7k ±10%
R316, 332, 335	6-124B14	470k
R317, 339	6-124A75	12k
R318	6-124A89	47k
R319, 323, 338	6-124A99	120k
R320, 321, 324	6-124C95	82k ±10%
R322	6-124C89	47k ±10%
R325	6-124C49	1k ±10%
R326	6-124C43	560 ±10%
R329	6-124A81	22k
R330	6-124A83	27k
R331	6-124C97	100k ±10%
R333	6-124B04	180k
R334	6-124A77	15k
R336	6-124A91	56k
R337, 340, 341	6-124A97	100k
R342	18-84944C01	var; 2k
R343	6-124C33	220 ±10%
R344	6-124C37	330 ±10%
R345	6-124A53	1-.5k
R347	6-124B12	390k
R350, 351, 352	6-124C81	22k ±10%
R354	6-124A67	5-.6k
R355	6-124A63	3-.9k
R315	6S13755D80	82-.5k

INTEGRATED CIRCUIT:

U301	51-84267A82
U302	51-84320A55
U303	51-84320A79

(SEE NOTE)	type M6782
	type NE565
	type CA3096AE

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- (8) F
b
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t
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o
- (9) W
o
- (10) A
C
P
- (11) R
n
s
f

HANDLING PRECAUTIONS FOR CMOS INTEGRATED CIRCUITS

of the integrated circuit devices used in communications equipment are of the CMOS (Complementary Metal Oxide Semiconductor) type. Because of their high open circuit impedance, they are vulnerable to damage from static charges. Care must be taken in handling, shipping, and storing them and the assemblies in which they are used.

Although protection devices are provided in CMOS IC inputs, the protection is effective only over a limited voltage range in the hundreds of volts range such as are encountered in an operating system. In circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules even in a

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions:

Before and after servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal earth grounded surface. This will discharge any static charge which may have accumulated on the person doing the servicing.

Whenever possible avoid touching any electrically conductive parts of the circuit module with your hands.

Normally, circuit modules can be inserted or removed with power applied to the unit. However, check the INSTALLATION and MAINTENANCE sections of the manual as well as the module schematic diagram to insure there are no objections to this practice.

When servicing a circuit module, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static buildup.

All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe. Similarly, disconnect the test probe prior to removing the ground lead.

A circuit module is removed from the system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through a resistance of approximately 100k.

WARNING

If the aluminum foil is connected directly to ground, be cautious of possible electrical shock from contacting the foil at the same time as other electrical circuits.

When soldering, be sure the soldering iron is grounded.

Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static buildup as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.

When replacing a CMOS integrated circuit device, leave the device in its metal rail container until it is to be inserted into the printed circuit module.

All low impedance test equipment (such as pulse generators, etc.) should be connected to the CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.

Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). NEVER USE NONCONDUCTIVE MATERIAL for packaging these modules.

MAXAR-80®
Two-Way FM Radio
136-174 MHz

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